Power Ethernet

Power Ethernet Socket 200AV T1000

User Manual

Version 1.23

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1. Before you start

1.1. Important Safety Instructions

IMPORTANT SAFETY INSTRUCTIONS

- Contact with mains electricity can cause serious injury or death. If in any doubt, get a competent electrician to install.
- Never open the back of PE Socket or try to service this product yourself!
  There is a risk of electric shock!
- Do not keep or use this product in areas of high humidity.
- To reduce the risk of fire or electric shock, do not expose the PE Socket to rain or moisture
- Always use a CAT5/6 Ethernet cable to connect the PE Socket with any network device.
- Do not insert any objects into the openings of the PE Socket.
- Slots and openings on the case serve as ventilation. Never block or cover them.
- Do not use the product without the front fascia plate installed.
- NEVER use water, paint thinner, benzene, alcohol or other strong cleaning agents to clean the device, as these could damage the plastic and risk electrocution or fire.
- NEVER use the device with a power supply different than 220-240 volts 50 Hz AC.
- In the event of damage, call a qualified electrician to disconnect the PE Socket from the power supply grid and contact customer service.
- **IMPORTANT: If in any doubt on how to install, consult a competent electrician.**

1.2. Important Information

Please note the following:

1. The PE Socket can be installed in 35mm deep UK Standard double gang metal back box. A matching plastics collar is available to aid installation.

2. The PE Socket is designed not to be completely flush to the wall and uses this air gap for ventilation purposes. Please ensure that any use of decorators chalk or other materials do not block this ventilation gap.

3. The PE Sockets are to be installed in accordance with the current edition of the IEE Wiring Regulations (BS7671: Requirements for Electrical Installations) and appropriate statutory regulations. In the Republic of Ireland, the installation must be in accordance with the ETCI National Rules for Electrical installations – ET 101.

NOTE: The power outlets must be electrically sharing the same power in order for the PE Sockets to provide a network connection between them. For more complex installations which may include multiple electrical phases, download the Power Ethernet Commercial Installations whitepaper from http://help.powerethernet.com

1.3. A note on Powerline Bandwidth Speeds

The available bandwidth on Powerline networks is depended on a number of factors including:

1. **The amount of electrical interference on the power circuit:** – Electrical noise on the mains wiring impacts the amount of available bandwidth on a Powerline network. Lamps with dimmers, scent plugins, mobile phone chargers, power transformers are amongst the nosiest devices. Its good practice to plug any offending devices directly into a PE Socket as its filter will minimise the effect of this electrical noise.

2. **RCBO's:** RCBO's are generally filters for Powerline communications. This is because they have a large choke built into them which is used for current measurement but this also acts as a filter. Powerline signal can still permeate this circuit if the source of the signal is close. Installing a PE socket as close to the consumer unit as possible helps gets around these issues.

3. **Cable distance between the PE Sockets:** The available bandwidth will decline over distance and the maximum range between PE Sockets is 300m. If the electrical cables between them are longer than 300m or the quality of the power network's cables is not optimal, the range of communication between sockets will be reduced. Please check if you are suffering from poor network speeds.

4. **Quality of the electrical cable**: Old electrical cable is likely to perform less well than newer cable.

1.4. HomePlug Alliance Compatibility

The PE Socket is compatible with the HomePlug AV standard which forms part of the IEEE1901 standard. If there are any other Powerline devices plugged in that are not HomePlug AV compatible, then they will stop the Powerline network from working properly.

Examples of these include earlier BT Vision Powerline Adapters based on the DS2 chipset. The latest BT Vision Powerline adapters are HomePlug AV compatible.

Further information on the standard can be found at www.homeplug.org

NOTE: Two or more PE Sockets (or HomePlug AV compatible devices) are required in order to create a Powerline network.

1.5. Legal Note

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2. Introduction

Thank you for choosing Power Ethernet's PE Sockets as your networking solution. The PE Sockets replace the traditional wall power sockets and provide an easy and fast way to set up a high-speed, secure Ethernet network throughout the building.

The technology incorporated in the PE Sockets allow the electrical cables already installed in the building to become a fast, reliable and secure network without the need of rewiring or installing additional cables. The PE Sockets have an integrated mains filter which improves the data transmission speeds, the network backbone is robust and equipped with QoS which optimises data flow and it is automatically encrypted with 128bit AES security.

The PE Sockets automatically go into power save mode when the network ports are not being used, reducing the power consumption by more than 50%. They are simple to install by any electrician, which makes them tamper and theft proof.

The PE Sockets incorporate a high speed managed switch with 4 Ethernet ports that eliminates the need for adding additional network switches and it is configured to prioritise local traffic. This removes the clutter and hassle of additional cables under desks or behind televisions and provides a solution with all the advantages of reliability, Health & Safety compliance and aesthetic appeal.

2.1. PE Sockets Green Agenda

For Power Ethernet, the energy consumption of our sockets has been an important part of our development, which is why every PE Socket automatically goes into power save mode with a reduced consumption of more than 50% when the Ethernet network ports are not being used. For further power savings, the PE Sockets incorporates a hibernation mode which allows the user to put individual units into hibernation (with less than ~0.5W power consumption) which provides more than 80% power saving. These savings in energy consumption have a positive impact on the environment as well as reducing costs in the organisation or home.

2.2. Package Contents

- PE Socket and Snap-on fascia, 2 screws (clipped on the back)
- Matching socket spacer or collar (if not included, contact us via http://**help.powerethernet.com**)
- Plastic fascia removal tool
- Quick Installation Guide
- Quick Set Up Guide

The latest version of the documentation can be downloaded from http://**help.powerethernet.com**

3. About PE Sockets

3.1. What makes the PE Sockets unique

PE Sockets are unique in the market as they are the only Powerline Communication products that embed all the electronics inside a standard wall power socket.

The PE Sockets incorporate the Qualcomm-Atheros 6400 Powerline chipset (which is compatible with HomePlug Alliance AV standard) along with other complementary technologies to create a high speed secure network by utilising the existing mains cables available throughout any building. Unlike Powerline adaptors, Power Ethernet networking solutions are suitable for home users and businesses in all sectors. The Power Ethernet network is designed to be robust and secure with an easy installation that is tamper and theft proof. The unit also complies with Health & Safety regulations.

PE Sockets have been developed with the highest quality standards and have been subjected to intensive testing procedures to ensure the best possible Powerline network performance. By connecting directly to mains via terminal screws (just like a traditional power socket) rather than being plugged in, the PE Socket makes a better quality connection to the mains and therefore is better at transmitting the Powerline signal across the mains.

The electronics have been built using the latest PLC designs in order to maximise the available bandwidth and robustness of the device. It incorporates the latest Powerline chip's software to take advantage of the latest developments from Qualcomm, the chip manufacturer.

The board's layout includes a high speed managed Ethernet switch with 4 RJ45 ports in each socket which eliminates the need for adding additional network switches. It includes advanced functionality through the managed switch which supports tagged VLANs, QoS (Quality of Service) and multicast IGMP for business class networking.

The socket includes an integrated mains filter in order to minimise the effect of any electrical noise on the circuit and therefore delivers the maximum available bandwidth. The network backbone is robust and encrypted with 128bit AES security making provision for dynamic (automatic) change of the encryption keys and for several different user experiences in setting up security and admitting devices to the network.

The network has a maximum throughput of 200Mbps (gross) which is fast enough to smoothly stream full-HD video. It's important to note that the 200Mbps refers to the total gross bandwidth shared between all PE Sockets on a single network. Each transmission of data across the Powerline network will reduce the available bandwidth.

PE Sockets have good green credentials with a built in micro controller that enables the sockets to automatically go into power save mode for reduced power consumption when the network ports are not being used; it also has the option to put individual units into deep hibernation for further power savings. (Less than ~0.5W)

The design incorporates over 100 additional components over a typical Powerline pluggable wall adapter in order to improve the network quality but also the durability of the unit. Externally the design aesthetics is the culmination of the socket having cooling vents that allow the product to cool with the convection of the room.

3.2. Optimising the PE Sockets performance

To optimise and increase the performance of the PE Sockets, the following steps are recommended:

- The PE Sockets should be at least 1 metre apart from noisy devices such as power supply units, mobile phone chargers, halogen lamps and dimmers.
- Test the influence of neighbouring mains powered devices by checking performance when they are off, and again when they are on.
- Test the influence of distant halogen lamp and dimmers by checking performance when they are off, and again when they are on.
- Try to plug noisy devices into filtered power supplies or directly into the PE Socket's filtered socket. The filtering will help eliminate any noise and to improve data transmission in the network.

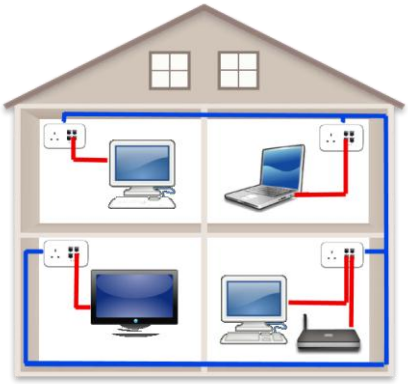
Further advice is included within the Troubleshooting section of this document.

NOTE: Further tips and suggestions are included in Section 7 and the latest FAQ can be accessed at http://**help.powerethernet.com**

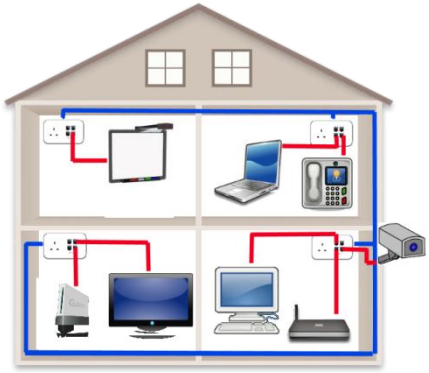
3.3. Application Diagrams

In the graphics below you will find some examples for possible networking designs.

Internet everywhere as a stand-alone application



Networking throughout the building with multiple applications



3.4. Benefits and Features

3.4.1. Benefits

- Simple to install networking solution: an all-in-one power socket that creates a secure network
- Internet access everywhere in the building: just connect the router to any one of your PE Socket
- Removes the need to run additional data cables: it uses the mains cables already in the walls
- Easily monitor the connection status of all the PE Sockets installed
- Easy to install by any electrician, wiring like a traditional power socket
- New class of intelligent high speed networking
- Is easy to expand: simply add more Power Ethernet Sockets
- Easy to deploy
- Theft proof
- Ideal for difficult data installations

3.4.2. Features

- Ethernet at up to 200Mbps (gross) across a meshed network
- 4 Switched Ethernet ports
- Built-in managed Ethernet switch
- Easy to read activity lights
- Passive cooling for silent operation
- Connect to a broadband router to share Internet access
- Fast enough to stream High Definition (HD) video
- Supports Quality of Service (QoS) and tagged VLANS
- Customised Data Content priority
- Supports Windows, Mac, Linux and all operating systems with TCP/IP support
- Filter socket to optimise data transmission
- Encrypted with 128bit AES security
- Compatible with the HomePlug AV standard
- Data range of 300 m (656 ft.) between the PE Sockets

4. PE Sockets Installation

The following instructions and safety information are also printed in the Power Ethernet Quick Installation Guide. These instructions should be read and understood fully before installation and should be kept for future reference.

4.1. Important Safety Instructions

IMPORTANT SAFETY INSTRUCTIONS

- Contact with mains electricity can cause serious injury or death. If in any doubt, get a competent electrician to install.
- Never open the back of PE Socket or try to service this product yourself!
  There is a risk of electric shock!
- Do not keep or use this product in areas of high humidity.
- To reduce the risk of fire or electric shock, do not expose the PE Socket to rain or moisture
- Always use a CAT5/6 Ethernet cable to connect the PE Socket with any network device.
- Do not insert any objects into the openings of the PE Socket.
- Slots and openings on the case serve as ventilation. Never block or cover them.
- Do not use the product without the front fascia plate installed.
- NEVER use water, paint thinner, benzene, alcohol or other strong cleaning agents to clean the device, as these could damage the plastic and risk electrocution or fire.
- NEVER use the device with a power supply different than 220-240 volts 50 Hz AC.
- In the event of damage, call a qualified electrician to disconnect the PE Socket from the power supply grid and contact customer service.
- **IMPORTANT: If in any doubt on how to install, consult a competent electrician.**

4.2. Important Information

Please note the following:

1. The PE Socket can be installed in 35mm deep UK Standard double gang metal back box. A matching plastics collar is available to aid installation.

2. The PE Socket is designed not to be completely flush to the wall and uses this air gap for ventilation purposes. Please ensure that any use of decorators chalk or other materials does not block this ventilation gap.

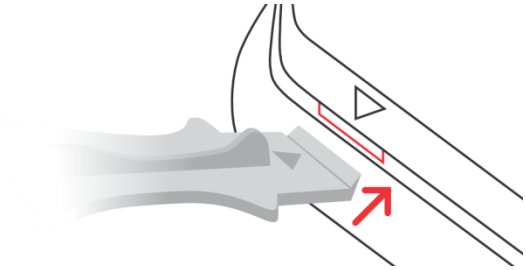
3. The PE Sockets are to be installed in accordance with the current edition of the IEE Wiring Regulations (BS7671: Requirements for Electrical Installations) and appropriate statutory regulations. In the Republic of Ireland, the installation must be in accordance with the ETCI National Rules for Electrical installations – ET 101.

NOTE: The power outlets must be electrically sharing the same power in order for the PE Sockets to provide a network connection between them. For more complex installations which may include multiple electrical phases, download the Power Ethernet Commercial Installations whitepaper from http://help.powerethernet.com

4.3. Installation Steps

IMPORTANT: If in any doubt on how to install, consult a competent electrician.

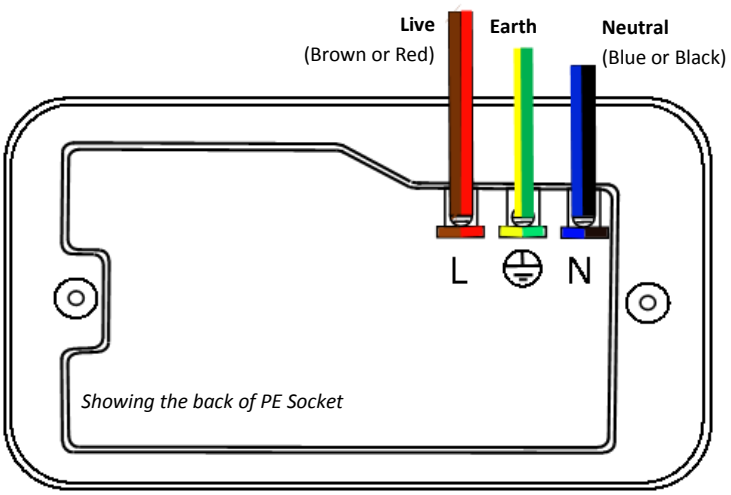
1. A flat-headed screw driver is required. (Do not use this for removing the fascia as a fascia removal tool is included.)
2. Switch OFF the mains supply and remove the appropriate fuse and switch OFF the relevant circuit breaker/fuse before commencing installation. Ensure that no one else has access that would enable the supply to be inadvertently reconnected. Check that the power is off before starting any work.
3. Remove the existing accessory from the wall (if using the new accessory to replace an old one).
4. Remove any plaster debris and dust from the inside of the mounting box (wall box). Ensure that the heads of any box fixing screws do not protrude into the box.
5. For the best installation results and visual appearance, it is recommended that prior to installation the mount surface beneath the PE Socket is first prepared to ensure that it is flat and even and all high spots have been removed.
6. If replacing an existing double gang socket with a PE Socket, remove the existing socket from the wall. Where required, add a UK double gang metal wall box with a minimum depth of 35mm in accordance with the relevant wiring regulations.
7. Gently remove the front fascia of the PE Socket using the supplied plastic fascia removal tool by lining up the tool with the triangle on the right edge of the fascia as per the diagram. Gently prise and repeat for the second triangle on the front fascia. Remove the front fascia.



8. Always use mains cable of the correct rating and type. If fitting into a ring circuit there will be 2 wires of each colour that must be connected to their respective terminal. If the wires are on a radial circuit or a spur there will be only 1 wire of each colour.
9. The layout of the terminal connections may differ between fittings. Carefully check the location of the terminal connections before wiring. NOTE: If the earth wire is bare it should be sheathed with a length of green/yellow sleeving.
10. Connect the PE Socket as per the wiring diagram shown in Figure A by inserting the wires into the correct terminals and tighten the screws firmly.
11. Secure the PE Socket to the wall by means of the fixing screws provided, positioning the mains cables in the back box so as to avoid them being trapped. If necessary, trim the excess mains cable.
12. Clip the fascia onto the PE Socket body by first inserting the catches on the left and then gently but firmly pushing the fascia towards the PE Socket. The front fascia should click into place.
13. Repeat the above procedure for any remaining PE Sockets.
14. Replace the appropriate fuse, or switch on the appropriate circuit breaker/fuse. Switch on the mains isolator switch.

4.4. Installation Wiring Diagram

Connect the cables as shown in the wiring diagram below (Figure A)



IMPORTANT NOTICE WIRING COLOUR CHANGES

As from 1st April 2004 new installations in the UK could be wired using the new EU harmonised colours for the supply conductors of twin and earth cable:

New colours	**Old colours**
BROWN – LIVE	RED – LIVE
BLUE – NEUTRAL	BLACK – NEUTRAL

The old colours ceased to be used on 1st April 2006.

Flexible cable colours remain unchanged:

BROWN – LIVE	BLUE – NEUTRAL

Eire conductor colours for twin and earth cable and flexible cable:

BROWN – LIVE	BLUE – NEUTRAL

4.5. Checking that the PE Sockets are working correctly

The PE Socket has two push buttons that can be accessed from the front and three LED lights directly underneath the 4 port managed switch Ethernet ports. The function of each is described in Section 5.

For the first 15 minutes after the power has been switched on, the PE Sockets will remain awake and displays its status via the front LED lights. This is designed as a visual check to see if all the units are working and able to connect to each other.

After the 15 minutes has elapsed, each unit will go to sleep if there is no active Ethernet connection plugged into it. (The Power light will go red.) The 15 minute timer can be restarted by either power cycling the devices or by pressing of the reset button (**R**) for 3 seconds on the PE Socket.

1. Within this 15 minute window, check that all PE Sockets are correctly installed and able to communicate with each other.

   For each PE Socket check the status of the lights:

   a) the Power light should be solid green which indicates that the device is powered on. If it has turned red, then the unit has gone to sleep (blinking means it is attempting to pair with other units).

   b) the PLC Connection light should be a solid colour showing that it is connected to other PE Sockets.

2. The PE Socket automatically wakes up from sleep mode within a couple of seconds when the device connected via an Ethernet cable is powered up and the Ethernet link becomes active.

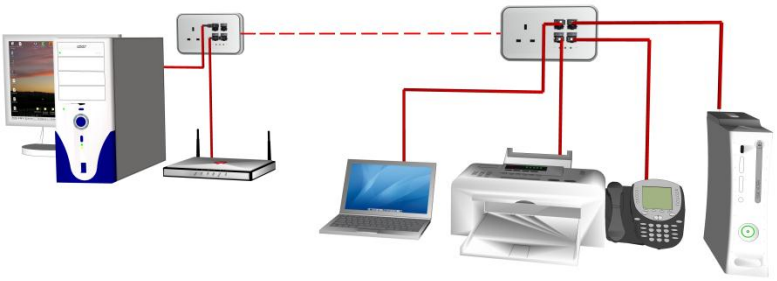
Once the PE Sockets are installed and powered up, setting up the network is very easy.

4.6. Setting up a network for the first time

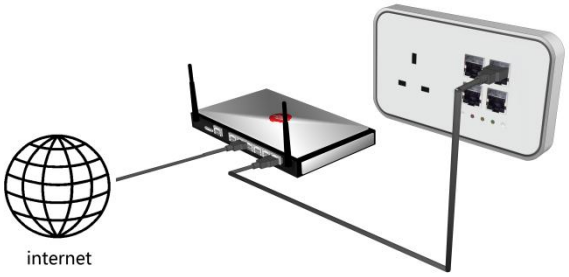
The PE Sockets are designed to automatically connect together to form a single meshed network secured with 128bit AES encryption. Each PE Socket comes with 4 Ethernet ports and once installed, all the Ethernet ports on each PE Socket are automatically linked together.

A) Connect a laptop, PC, printer, VoIP handset or game console using a CAT5 cable to any Ethernet port on one of the PE Sockets

B) Connect the other Ethernet devices to the other PE Sockets using CAT5 cables.



C) To share Internet access among all these devices, simply connect the Internet router to any one of the PE Sockets using a CAT5 cable.



Whenever there is an active Ethernet connection, the Network Activity light on that PE Socket will light up, the PE Socket will wake up (power light goes green) and then connect to other awake PE Sockets (the PLC Connection light will show its status).

It's that simple! Now enjoy a fast secure network with Internet connectivity everywhere a PE Socket has been installed.

NOTE: Two or more PE Sockets are required in order to create a Powerline network. The PE Sockets must be electrically sharing the same power in order for PE Sockets to provide a network connection between them.

IMPORTANT: This installation guide is suitable for home users or small businesses that are setting up or extending a network across a single phase power. For more complex installations please download the Power Ethernet Commercial Installations whitepaper from http://help.powerethernet.com

5. PE Socket Functions, Lights and Buttons

The PE Socket has two push buttons and three LED lights directly underneath the 4 port managed Ethernet switch ports. The function of each is described below.

5.1. Lights Definitions and Buttons Description

LIGHTS	STATE	DESCRIPTION
Power	**Solid green.** **Red.** **Flashing.** **Dimmed red.** **Off.**	Power is on. Sleep mode. Unit is in paring mode Forced hibernation. No power.
PLC Connection	**Off.** **Solid.** **(Solid colour denotes connection speed)**	No Powerline network activity PLC network connection (paired). **Green**: Powerline network is detected with high transfer speed (suitable for HD video streaming). **Orange**: Powerline network is detected with medium transfer speed (suitable for SD video streaming). **Red**: Powerline network is detected with low transfer speed.
Network activity	**Off.** **Blink.** **Solid green.** **Solid yellow**	Unit is sleep mode or no active Ethernet connection. Network activity. 100Mbps Ethernet connection is detected. 10Mbps Ethernet connection is detected Note: the Ethernet speed colour denotes the fastest speed found in the connections to all 4 Ethernet ports

Button Descriptions

BUTTON	PRESSES	DESCRIPTION
Reset R	Press for 3 seconds. Press and hold for more than 7 seconds.	Reset / Wakes up the PE Socket. This restarts the 15 minute stay awake timer. Forced hibernation mode. The electronics goes to sleep and will not wake up when an active Ethernet connection is detected. Reset the device, using a short press of the reset button, to exit hibernation mode.
Join/Leave	Press for 0.5 to 3 seconds Press and hold for more than 10 seconds.	Initiate pairing mode for the next 2 minutes. Power light will flash. Another short press will exit join/leave mode. The unit will automatically exit pairing mode after 2 minutes Unit leaves the current Powerline network and generates a random Network Password.

5.2. Integrated electrical socket

The PE Sockets are equipped with a standard UK power socket which has a built in mains filter to help eliminate any electrical noise generated by devices plugged directly into it. Electrical noise on the mains cables affects the amount of available bandwidth and therefore it is highly recommended to plug any such electrically noisy devices (including transformers and mobile phone chargers) directly into the PE Socket because the built-in filter will help reduce this electrical noise, which may significantly improve the data transmission speeds across the Powerline network.

The design by connecting the mains via terminal screws means that the PE Socket has a better RF (Radio Frequency) connection for transmitting the Powerline signal.

TOP TIP: Plug any noisy electrical devices directly into the PE Socket's filtered socket to improve the network performance.

NOTE: Do not plug a Powerline adapter into the PE Socket's filtered socket as the filtering will block the Powerline signal to the adapter.

5.3. Securing the network and joining/leaving mode

5.3.1. Securing the Powerline network

As part of the HomePlug AV standard, the Power Ethernet Socket ships with a default Network Password set to *HomePlugAV.* The Network Password is used as the encryption key for the 128bit AES encryption. In order for Powerline devices to be able to connect together; they need to share the same Network Password.

It is highly recommended to change the Network Password as, if left to the default of *HomePlugAV*, and then any HomePlug AV compatible Powerline devices configured with this default Network Password on the same electrical system will be able to automatically join the network. By changing the Network Password, you will secure your Powerline network.

With most Powerline adapters (including Power Ethernet Sockets), the Join/Leave button is a quick way to change or sync a handful of devices to the same Network Password, thereby creating a network. This works well when the adapters are in the same room as all the Join/Leave buttons will need to be pressed within a short time frame (typically 2 minutes).

Power Ethernet Sockets, however, are installed into the wall, often in hard to reach places and are also unlikely of being in the same room. This would require running around the building pressing the join/leave buttons within a short time frame with the risk that, if it is not done quickly enough, the Powerline network could be segmented into multiple isolated networks.

The recommended and safest method of changing the Network Password is to use the Power Ethernet Monitoring Software (PEMS) described in Section 6 as this gives you complete control over the password with the added benefit that it will report on the actual number of units that are linked together and the estimated bandwidth speeds between them.

Below is a summary of the different ways to secure the Powerline network or to add or remove a Powerline device from an existing network:

Method	Advantages	Disadvantages
Join/Leave Button on the front	• No software required	• No control over the actual password used (it is chosen automatically by the devices) • All button presses need to be completed within the 2 minute time window • No confirmation that all devices are connected together in a single network.
Using the PEMS – the Power Ethernet Management Software	• Network Password can be defined • Shows the number of sockets connected and the estimated speeds between them • No time limit to complete the password changes	• Requires a Windows laptop and an Ethernet cable

Whichever method you choose, the Network Password only needs to be changed once per device and from then on is remembered by the PE Socket. The definitions of the front lights and the buttons are explained in Section 5 of this user guide. The installation and use of the PEMS software is described in Section 6.

5.3.2. To secure the network via from the front buttons

Newly installed PE Sockets can be secured via a random Network Password using the front panel.

NOTE: This method is not recommended as it is possible to split the network into different segments without any indication from the front lights. The recommended method is to use the PEMS software as it gives complete control, confirms the number of units in the network and has a full range of diagnostic utilities.

Assuming the PE Sockets have just been installed and the power is switched on, perform a short press on the Join/Leave button on each unit with no more than a 2 minute gap between presses. If the 2 minutes has elapsed, go back to the first unit and put it into join mode by a short press of the Join/Leave button and then continue adding units.

TOP TIP: If the network is not behaving as expected, then the PEMS software needs to be installed and each unit's Network Password set to the identical password via the software. This is detailed in Section 6 of this manual.

5.3.3. Joining an existing Powerline network.

As part of the HomePlug AV standard, the PE Socket can be configured to join or leave a Powerline network via the Join/Leave button on the front. A short press of the Join/Leave button puts the unit into Join mode whereas a long press (10 seconds) will force the unit to leave the currently defined network.

If the existing Powerline network is using the default Network Password of "*HomePlugAV*", then new PE Sockets will join the existing network automatically. This is the default configuration shipped from the factory.

If the existing Powerline network is using a Network Password that is not "*HomePlugAV*": (See Section 5 for the how long buttons should be pressed)

1. Short press the Join/Leave button on a unit on the existing network. The power light will flash.
2. Short press the Join/Leave button on the new PE Socket.
3. The new PE Socket will flash its power light rapidly for a few seconds and then restart. After the restart, it will be on the existing network.

5.3.4. To leave a Powerline network and join another

To make a PE Socket leave a Powerline network, press and hold the Join/Leave button for more than 10 seconds and then release. The unit will reboot itself and the Powerline LED light will go out.

To join a new network, put an existing and the new unit in join mode (as described above)

TOP TIP: If a particular unit does not want to join an existing network, try the following steps:

1. Press and hold the Join/Leave button for more the 10 seconds to force it to lose its current Network Password
2. Go to one of the units which is a member of the desired network and put it into pairing mode (a short press on the Join/Leave button as described above)
3. Go back to the unit that needs to join the Powerline network and put it into pairing mode
4. The units should now pair and the Powerline light should indicate the estimated Powerline quality.
5. If for any reason, the units do not pair, refer to the Troubleshooting section of this guide or the online FAQ which can be found at http://help.powerethernet.com

NOTE: The most likely reason why units may not link together is that they have different Network Passwords. It is highly recommended that you try resetting the network password (via the software) before calling technical support.

5.4. Sleep Mode

The PE Socket automatically goes into sleep mode when there is no active Ethernet connection. When in sleep mode, the power light is a solid red colour. The PE Socket automatically wakes up from sleep mode when the device connected to it via an Ethernet cable is powered up.

NOTE: It can take a couple of seconds for a PE Socket to exit sleep mode and connect to other Powerline devices. The lights on the front of the PE Socket will show the current status.

5.5. Hibernation mode

When not in use for an extended period, a PE Socket can be put into a deep hibernation mode which dramatically reduces its power consumption. Press and hold the Reset button for more than 7 seconds and the Power light will go a solid dimmed red colour. A short press the Reset button (**R**) will exit hibernation. Whenever the Reset button is pressed, the PE Socket will go into diagnostic mode and stay on for at least the next 15 minutes. After the 15 minutes, the PE Socket will go to sleep if there is no active Ethernet connection.

5.6. Quality of Service

The PE Sockets have integrated "Quality of Service" functions (QoS) which measure the bandwidth requirements of each application and optimise the data flow, ensuring that bandwidth-intensive applications such as streaming High Definition (HD) video or music get priority. The PE Sockets will also give priority to Voice over IP and IPTV to get the best performance out of the network.

6. Power Ethernet Monitoring Software (PEMS)

PEMS has been developed by Power Ethernet as a useful tool that will allow you to:

- Check the number of PE Sockets (and other HomePlug compatible devices) that are visible on the Powerline network
- Change the default Network Password to create a private Powerline network and prevent additional PE Sockets and 3rd party devices from automatically joining the network
- Assess the performance of each PE Socket (the Device Password maybe required to access remote PE Sockets settings)

Note: Two or more PE Sockets must share the same Network Password in order to create a network.

PEMS also offers advanced network configuration which allows you to:

- Segment the network into different networks by setting different Network Passwords per group of PE Sockets
- Upgrade the firmware
- Manage databases
- Configure Virtual LAN settings

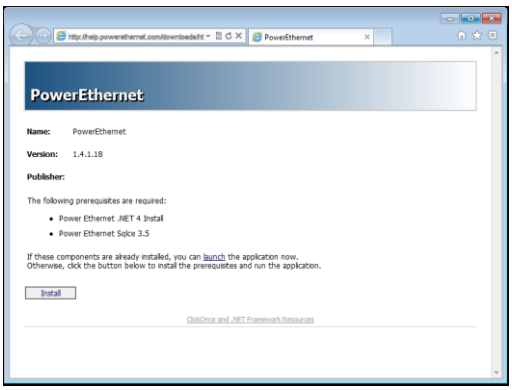
NOTE: There are two passwords in the HomePlug AV standard. The Network Password is used as the encryption seed and only units sharing the same Network Password will be able to join together. The second is the Device Password which is printed on the back of the device and included in the Quick Setup guide for each unit. The Device Password is required to make changes to remote Powerline devices via the network. With PE Sockets, the Device Password functionality is reserved for future use.

6.1. Installing

Important: Before installing PEMS, please verify that no other Powerline management software are installed before installing the provided software. If other Powerline Utilities are installed, uninstall them and restart your personal computer before installing this provided software.

6.1.1. For Microsoft Windows XP or later.

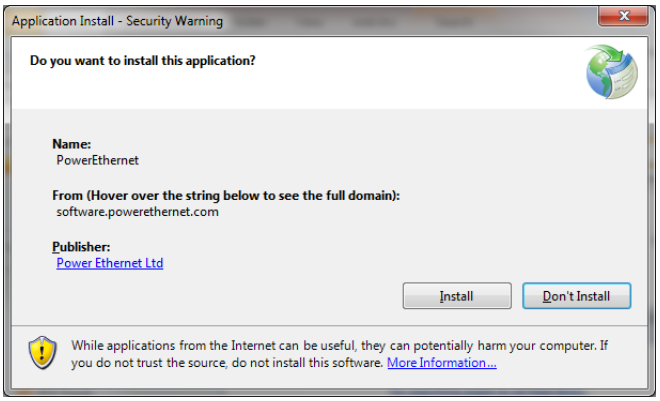
This section covers how to install PEMS on Microsoft Windows XP or later. Download the latest version of PEMS from http://**help.powerethernet.com/**

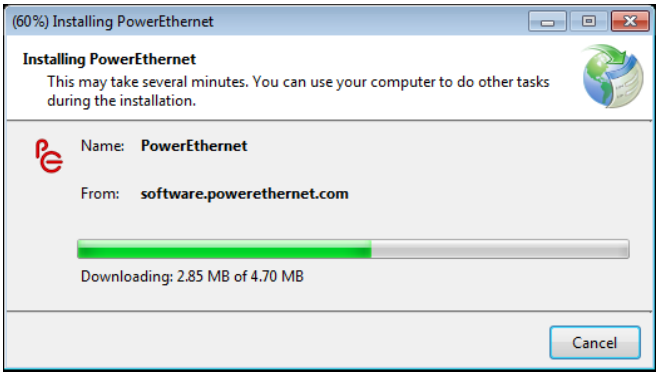

PowerEthernet
Name: PowerEthernet
Version: 1.4.1.18
Publisher:
The following prerequisites are required:
Power Ethernet .NET 4 Install
Power Ethernet Sqlce 3.5
If these components are already installed, you can launch the application now.
Otherwise, click the button below to install the prerequisites and run the application.
Install

Click on the "Install" button to download and install the software

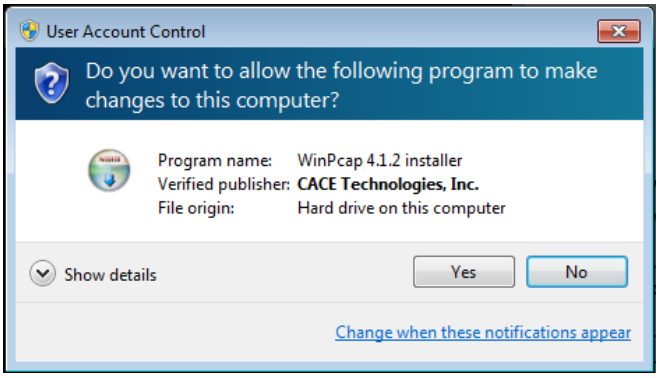
Note: The help.powerethernet.com web site hosts the latest versions of the software and the version downloaded may be later than the screenshots in this user guide

1. Follow the installer prompts

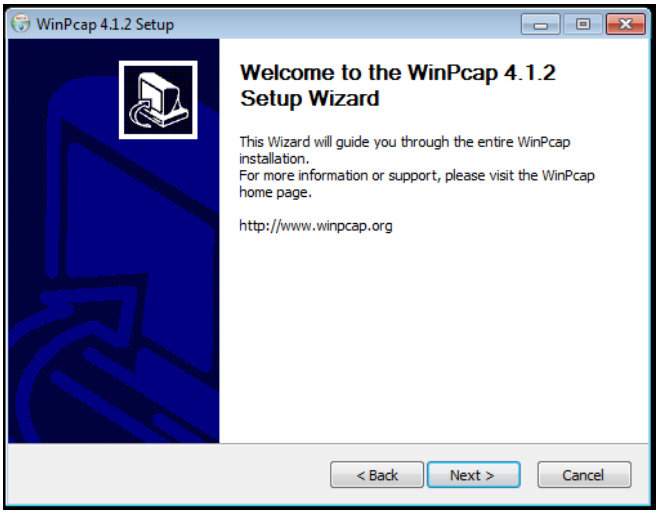

Application Install - Security Warning
Do you want to install this application?
Name:
PowerEthernet
From (Hover over the string below to see the full domain):
software.powerethernet.com
Publisher:
Power Ethernet Ltd
Install
Don't Install
While applications from the Internet can be useful, they can potentially harm your computer. If you do not trust the source, do not install this software. More Information...

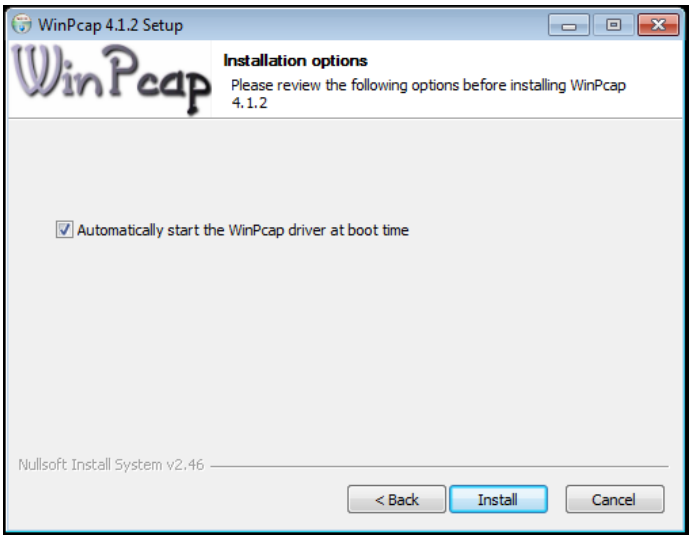

(60%) Installing PowerEthernet
Installing PowerEthernet
This may take several minutes. You can use your computer to do other tasks during the installation.
Name: PowerEthernet
From: software.powerethernet.com
Downloading: 2.85 MB of 4.70 MB
Cancel

2. If not already installed, the installation process will require **WinPcap** software to be installed. This is required by PEMS.


User Account Control
Do you want to allow the following program to make changes to this computer?
Program name: WinPcap 4.1.2 installer
Verified publisher: CACE Technologies, Inc.
File origin: Hard drive on this computer
Show details
Yes
No
Change when these notifications appear

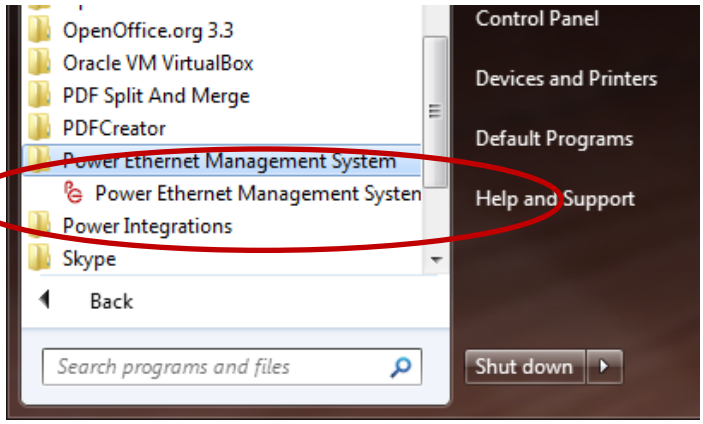
3. Follow the installer prompts


WinPcap 4.1.2 Setup
Welcome to the WinPcap 4.1.2 Setup Wizard
This Wizard will guide you through the entire WinPcap installation.
For more information or support, please visit the WinPcap home page.
http://www.winpcap.org
< Back
Next >
Cancel



Note: Ensure that the "Automatically start the WinPcap driver at boot time" is ticked otherwise PEMS will not be able to access the PE Sockets.

4. Once PEMS and WinPcap have been installed, you should find the **Power Ethernet Management System folder** in the Start menu under all programs.



5. Click on the "Power Ethernet Management System" entry to run the software.

6.1.2. For Microsoft Windows 8

This section covers how to install PEMS on Microsoft Windows 8.

Note: The standard WinPcap fails to install under Windows 8. The following steps explain how to manually install WinPcap so that that PEMS can then be installed. Once installed, PEMS runs fine under Windows 8.

To Install PEMs on Windows 8, there are two stages:

1. Install "WinPcap"
2. Install PEMS

1. Installing WinPcap.

WinPcap is an application that is used by PEMS to talk to HomePlug AV devices. It isn't supported on Windows 8 but works correctly, providing it's installed using the "Windows Compatibility Assistant".

Use Desktop Mode

All of the following work is done on the Windows 8 desktop. Click on the “Desktop” tile on the start screen before proceeding.

Download WinPcap

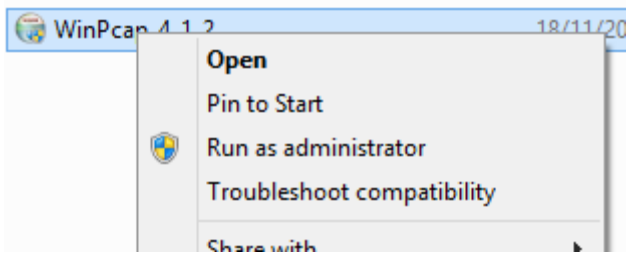
Start Internet Explorer and browse to http://www.winpcap.org/install/default.htm. Click the download button on “Installer for Windows”.

You’ll be asked what you want to do with the downloaded installer. Click on “Save”.

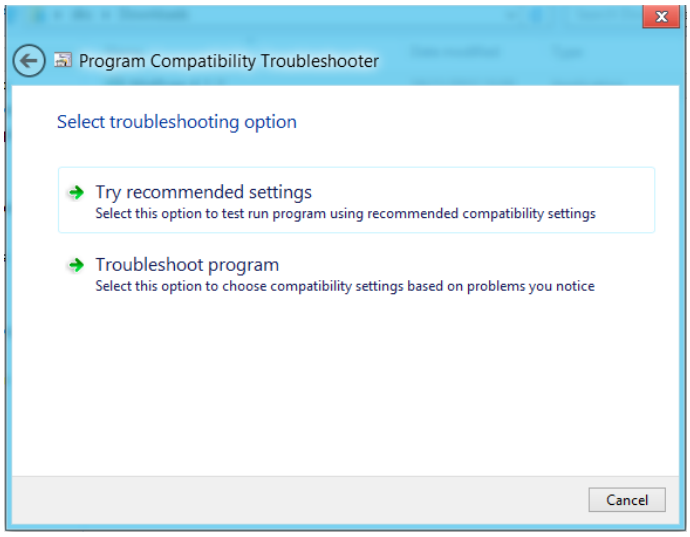
Do you want to run or save WinPcap_4_1_2.exe (894 KB) from winpcap.org?
This type of file could harm your computer.
Run
Save
Cancel

Once the installer has downloaded, click “Open folder”.

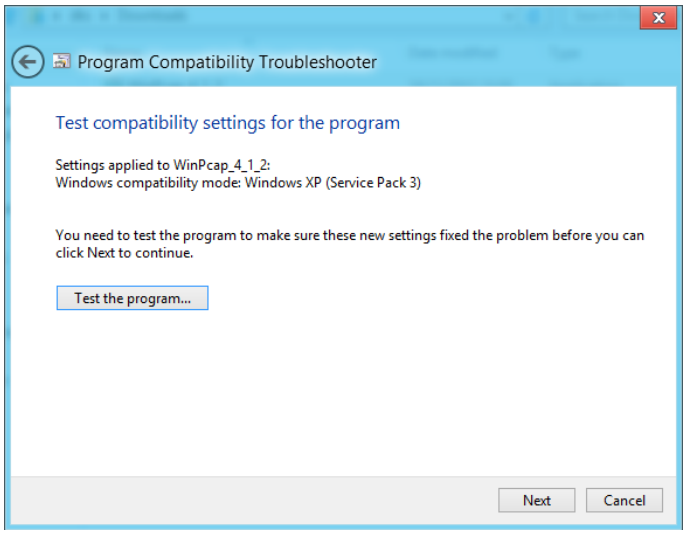
You’ll see a file called “WinPCap_4_1_2”. Right-click on it and choose “Troubleshoot compatibility”.



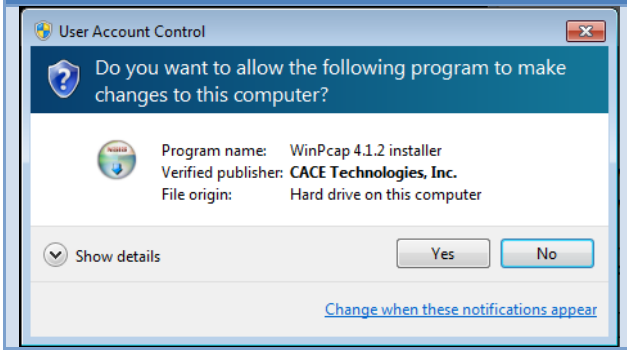
On the next window, choose “Try recommended settings”.


Program Compatibility Troubleshooter
Select troubleshooting option
Try recommended settings
Select this option to test run program using recommended compatibility settings
Troubleshoot program
Select this option to choose compatibility settings based on problems you notice
Cancel

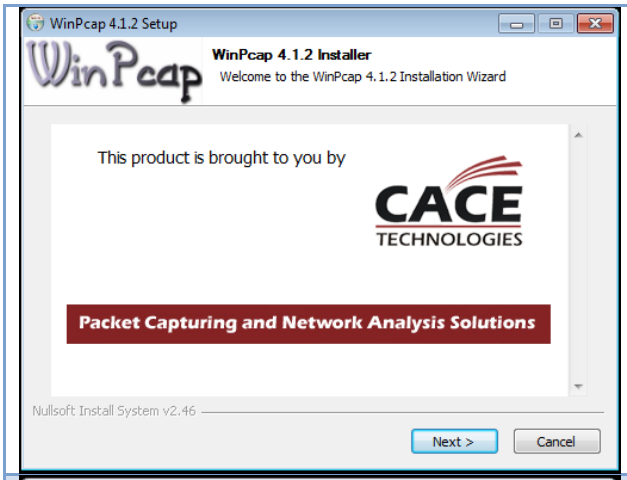
Now click on “Test the program…”


Program Compatibility Troubleshooter
Test compatibility settings for the program
Settings applied to WinPcap_4_1_2:
Windows compatibility mode: Windows XP (Service Pack 3)
You need to test the program to make sure these new settings fixed the problem before you can click Next to continue.
Test the program...
Next
Cancel

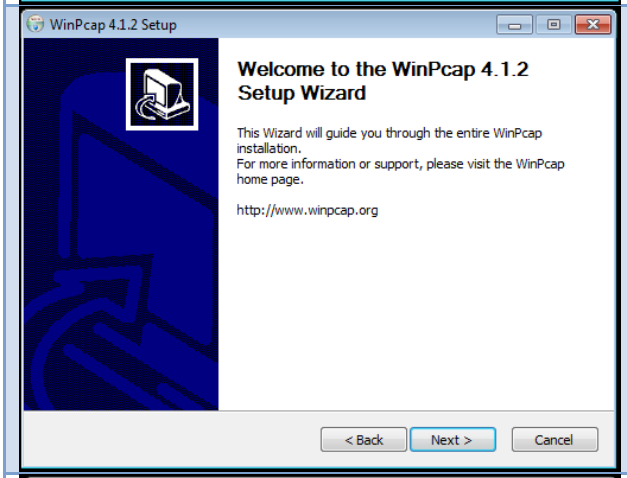
Now, you are ready to install the WinPcap installer, follow the prompts as shown:

Screen	Action
	Click **Yes** to allow the installer to proceed

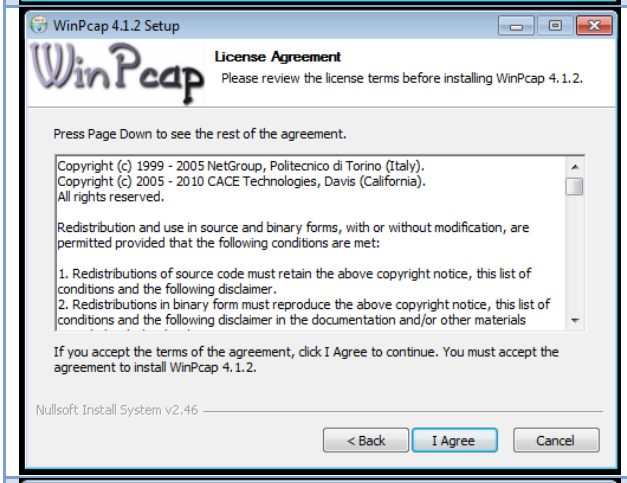
User Account Control
Do you want to allow the following program to make changes to this computer?
Program name: WinPcap 4.1.2 installer
Verified publisher: CACE Technologies, Inc.
File origin: Hard drive on this computer
Show details
Yes
No
Change when these notifications appear



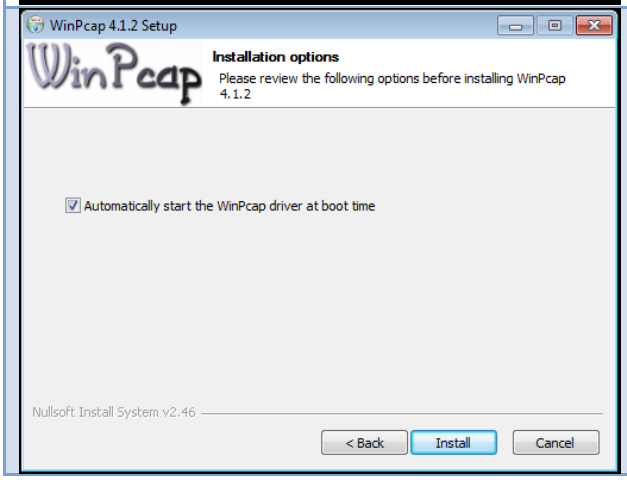
Click **Next**


WinPcap 4.1.2 Setup
Welcome to the WinPcap 4.1.2 Setup Wizard
This Wizard will guide you through the entire WinPcap installation.
For more information or support, please visit the WinPcap home page.
http://www.winpcap.org
< Back
Next >
Cancel

Click **Next**

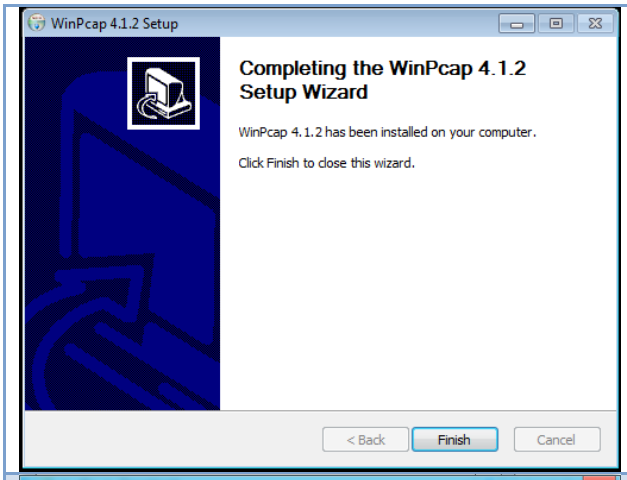

WinPcap 4.1.2 Setup
License Agreement
Please review the license terms before installing WinPcap 4.1.2.
Press Page Down to see the rest of the agreement.
Copyright (c) 1999 - 2005 NetGroup, Politecnico di Torino (Italy).
Copyright (c) 2005 - 2010 CACE Technologies, Davis (California).
All rights reserved.
Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:
1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials
If you accept the terms of the agreement, click I Agree to continue. You must accept the agreement to install WinPcap 4.1.2.
Nullsoft Install System v2.46
< Back
I Agree
Cancel

Click "**I Agree**"

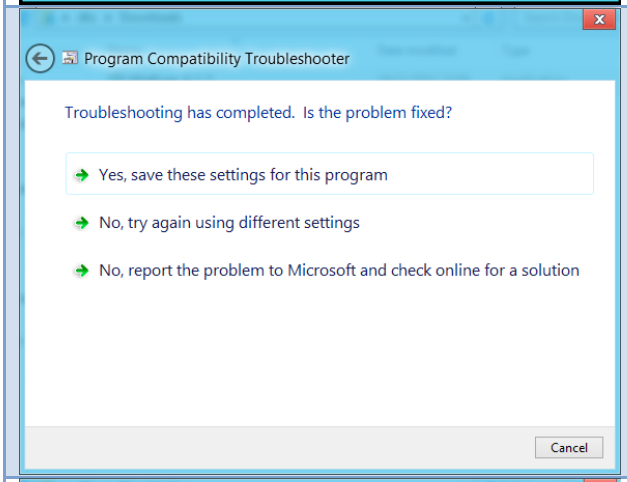


Click "**Install**"

Important: Don't uncheck the tick box. It must be ticked for PEMS to work!

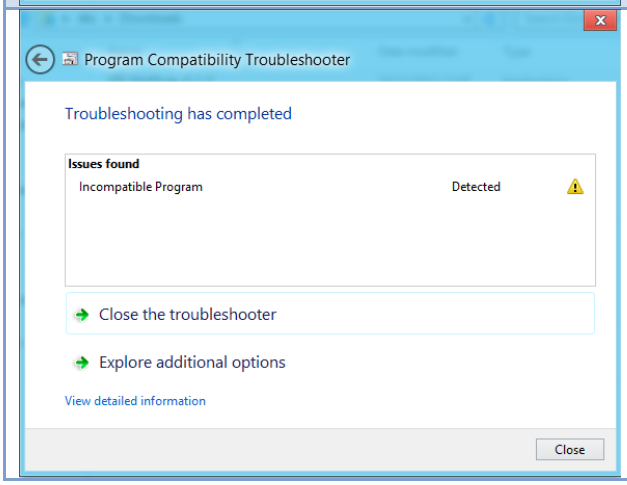


Click "**Finish**"


Program Compatibility Troubleshooter
Troubleshooting has completed. Is the problem fixed?
Yes, save these settings for this program
No, try again using different settings
No, report the problem to Microsoft and check online for a solution
Cancel

Now tell Windows that everything worked correctly.

Click "**Yes, save these settings for this program**"

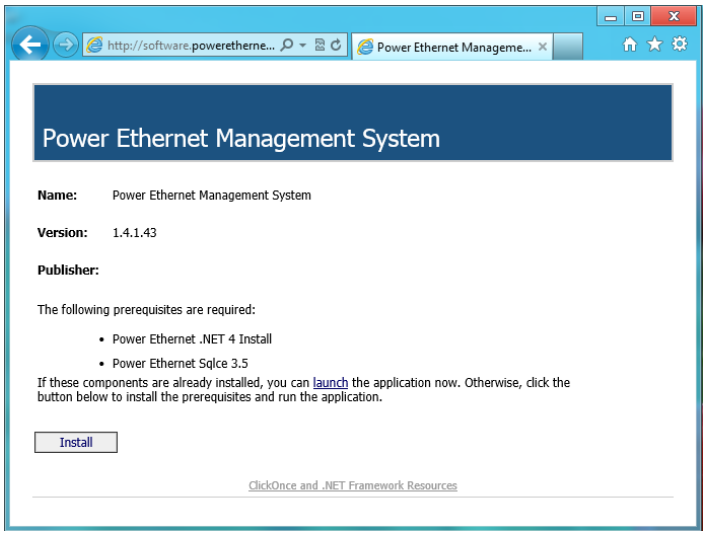


Click "**Close the troubleshooter**".

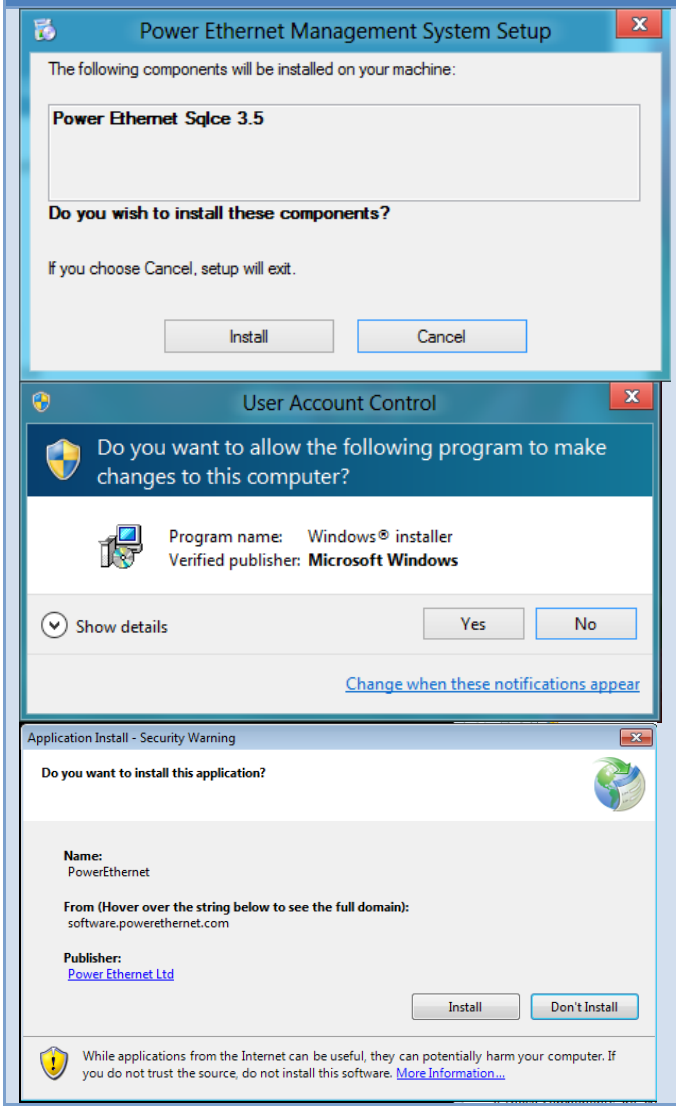
WinPcap has now been installed. Next step is to install PEMS.

2. *Installing PEMS*

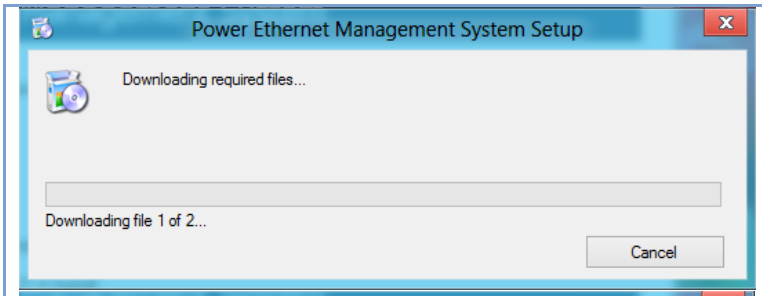
Return to Internet Explorer and download the latest version of PEMS from **http://help.powerethernet.com/**

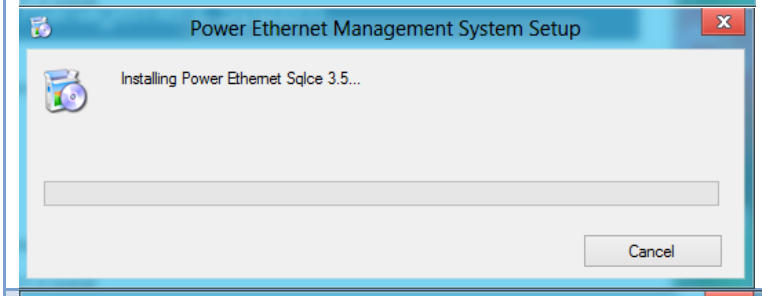

Power Ethernet Management System
Name: Power Ethernet Management System
Version: 1.4.1.43
Publisher:
The following prerequisites are required:
Power Ethernet .NET 4 Install
Power Ethernet Sqlce 3.5
If these components are already installed, you can launch the application now. Otherwise, click the button below to install the prerequisites and run the application.
Install
ClickOnce and .NET Framework Resources

Click “Install” button to download the software then, follow the prompts as shown:

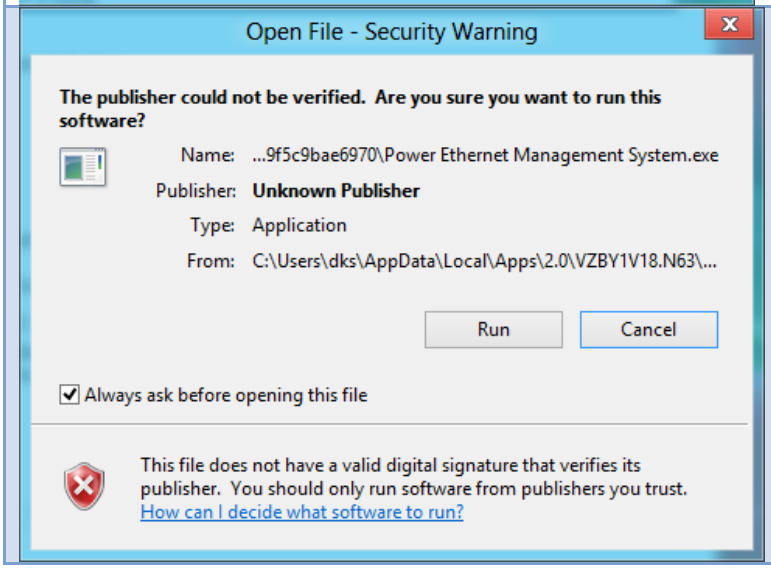
Screen	Action
	If you see these, which may happen several times on 64 bit versions of Windows 8, click “**Install**” or “**Yes**”

Power Ethernet Management System Setup
The following components will be installed on your machine:
Power Ethernet Sqlce 3.5
Do you wish to install these components?
If you choose Cancel, setup will exit.
Install
Cancel
User Account Control
Do you want to allow the following program to make changes to this computer?
Program name: Windows® installer
Verified publisher: Microsoft Windows
Show details
Yes
No
Change when these notifications appear
Application Install - Security Warning
Do you want to install this application?
Name:
PowerEthernet
From (Hover over the string below to see the full domain):
software.powerethernet.com
Publisher:
Power Ethernet Ltd
Install
Don't Install
While applications from the Internet can be useful, they can potentially harm your computer. If you do not trust the source, do not install this software. More Information...





At various points, you'll see download and installation progress bars.

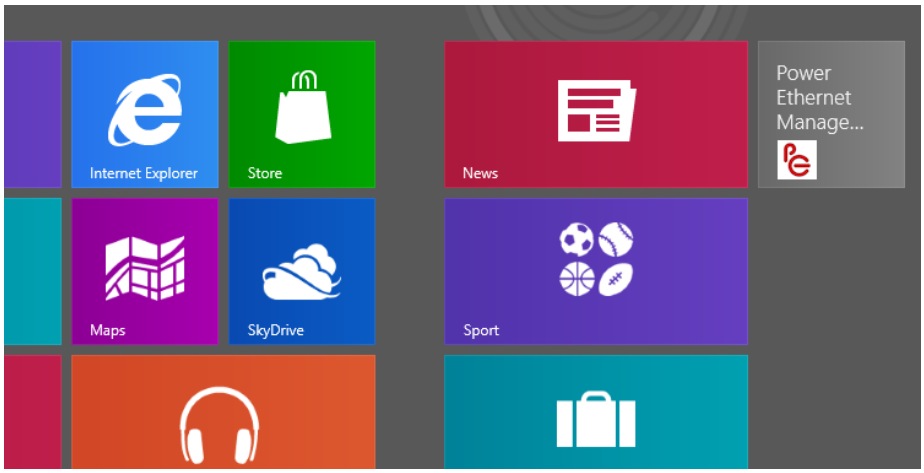

Open File - Security Warning
The publisher could not be verified. Are you sure you want to run this software?
Name: ...9f5c9bae6970\Power Ethernet Management System.exe
Publisher: Unknown Publisher
Type: Application
From: C:\Users\dks\AppData\Local\Apps\2.0\VZBY1V18.N63\...
Run
Cancel
Always ask before opening this file
This file does not have a valid digital signature that verifies its publisher. You should only run software from publishers you trust.
How can I decide what software to run?

Important! Make sure you ***uncheck*** the tick here!

There must be no tick on this window, before hitting Run.

If you don't uncheck the box, PEMS will not run correctly!

PEMS installs a tile on the start screen, which you can use to start the application.



.

6.2. PEMS Basic Functionality

After you have successfully installed PEMS, you can set up or configure the Powerline devices according to your needs.

PEMS will allow you to:

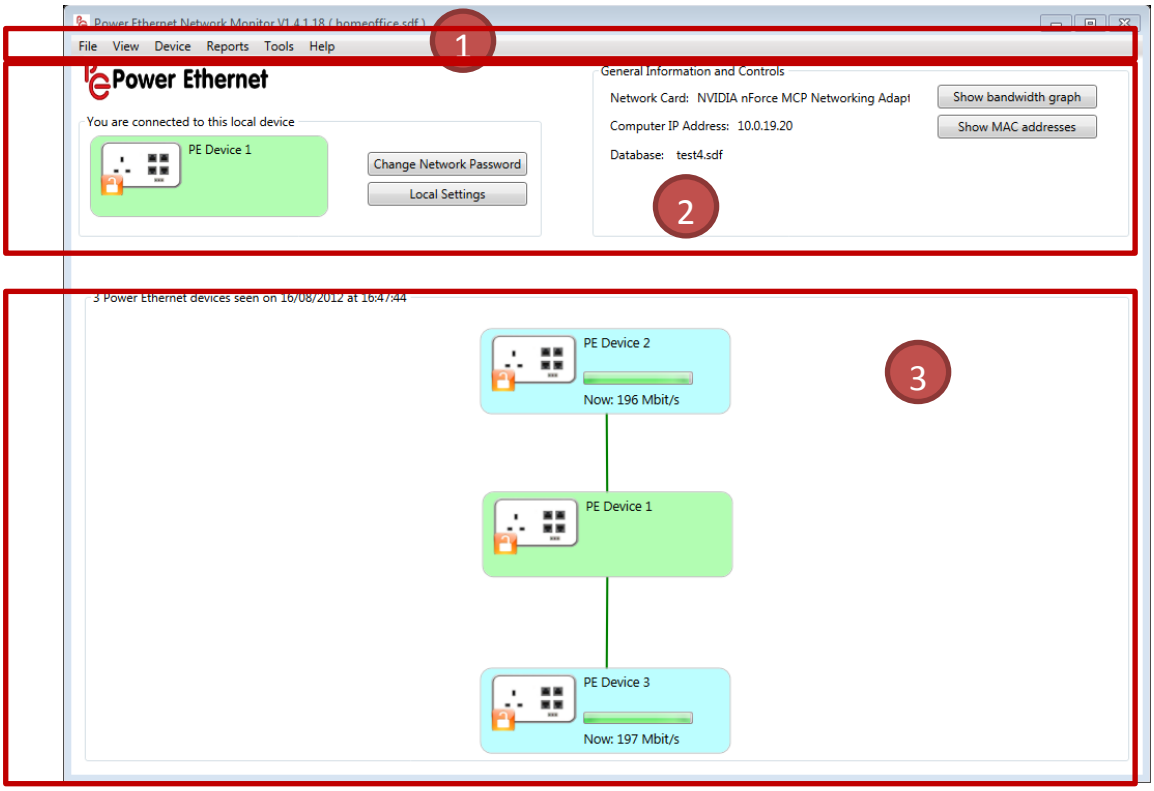
- Check the number of PE Sockets (and other HomePlug AV compatible devices) that are visible on the network
- Change the default Network Password to secure the Powerline network or to create a private Powerline network. This will prevent other PE Sockets from automatically joining the network
- Assess the performance of each PE Socket

IMPORTANT: You need to connect your computer running PEMS to the PE Sockets using a CAT5 Ethernet cable. Two or more Power Ethernet sockets must share the same Network Password in order to create a network.

NOTE: It is highly recommended to turn off WiFi access and use an Ethernet cable to connect your computer to a PE Socket. If WiFi is enabled, there is a possibility that the PE Socket that you connect to will likely to be the closest one to the WiFi router, rather than the one closest to your computer.

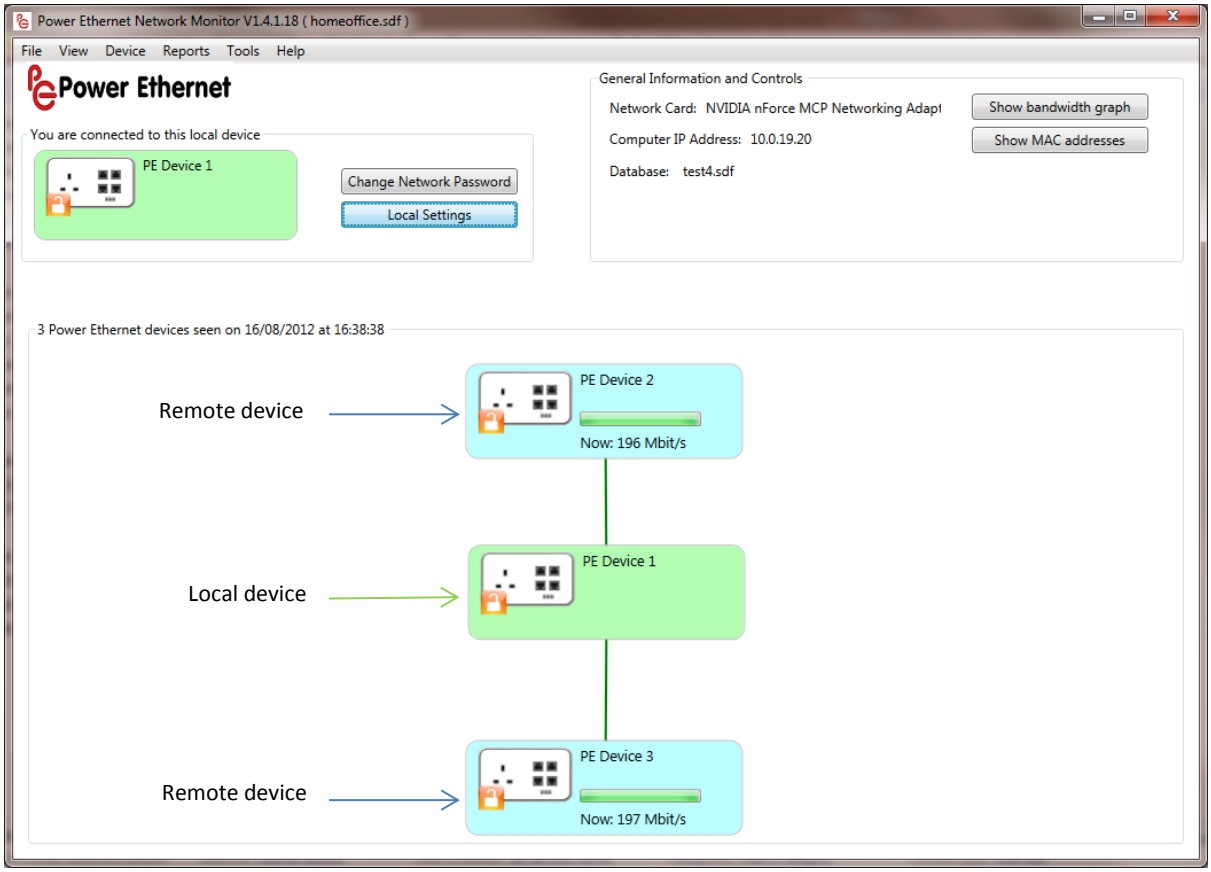
6.2.1. PEMS main screen

PEMS screens are broken down in three sections:



1. The pulldown menu allows a quick way to access the PE Socket functionality
2. Information and settings for the locally connected PE Socket known as “local device”
3. Current view of the Powerline network along with estimated Powerline bandwidth. There are three different views which can be selected via the View pulldown menu.

6.2.2. Number of PE Sockets visible on the network



You can easily check the number of PE Sockets (and other HomePlug AV compatible devices) that are connected to the network.

The above screen shot shows three PE Sockets connected to each other: PE Device 1, 2 and 3.

In the example above, the PE Device 1 is your "**local device"**, which is the device connected directly to your computer; the other two are your "**remote devices",** which are all the other devices connected to the local one and which are part of the same Powerline network. The local device is always shown at the top of the screen as well.

In the example above, we have installed 3 PE Sockets and we can see they are all visible to each other.

TIP: If you cannot connect to the local PE Socket or cannot see all the units that have been installed, please see the Troubleshooting at section 7

NOTE: The PE Sockets need to be awake in order to be found by PEMS. If any of the PE Sockets have gone to sleep (the Power light is red) then the unit needs an active Ethernet device plugged into it like a router or a computer. Units can also be put into "Always Awake" mode. After all the devices have been found by PEMS, it will show which units are awake and which are asleep.

6.2.3. PE Socket current status

The PE Sockets current status can be check by looking at the colour of each device as per the table below:

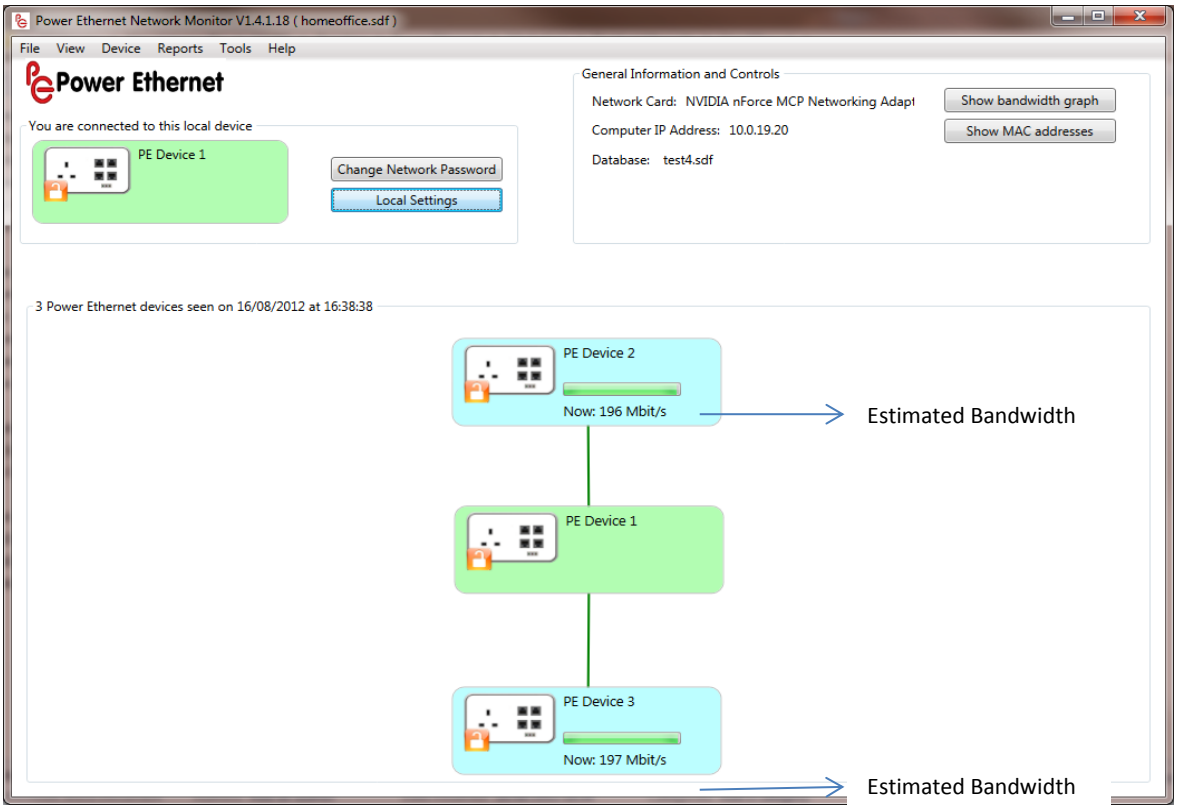
PE Socket Icon	Description	T1001 bandwidth range
White	Unit is awake and link quality is good to excellent (suitable for HD video streaming)	80 to 200 Mbps
Yellow	Unit is awake and link quality is ok to good. (suitable for SD video streaming)	30 to 80 Mbps
Red	Unit is awake and the link quality is poor.	0 to 30 Mbps
Grey	The unit is powered down, in sleep mode or communications have been lost.	No connection

NOTE: The padlock symbol is shown when the Device Password for that specific device has not been entered. The Device Password functionality is reserved for future use.

NOTE: PEMS will also display any other Powerline device current status using the same range of colours although the bandwidth range settings may vary by manufacture.

6.2.4. The Estimated Powerline Bandwidth

In the graphic below, you can see every PE Socket that is connected to the network and the estimated Powerline bandwidth in Megabits per second which shows the total amount of traffic that could flow on it.



NOTE: The estimated Powerline bandwidth is measured on the speed of the link between the local device and the remote devices. This is why there is no bandwidth displayed for the local device.

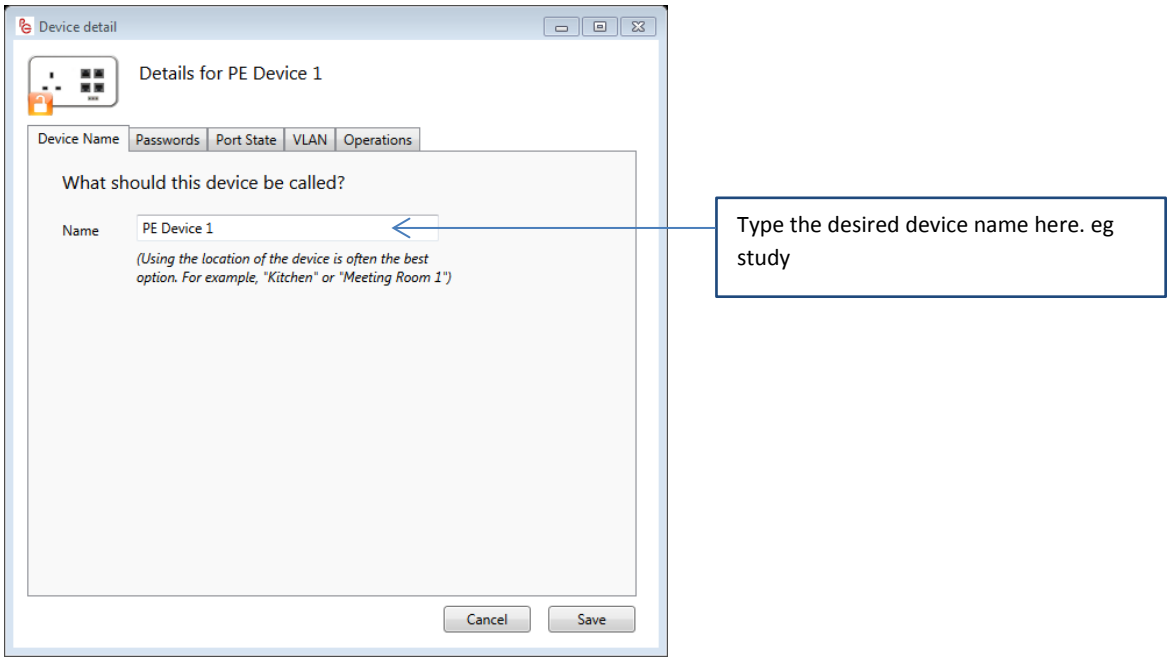
6.2.5. Changing the PE Socket's Name

Changing the names of the PE Sockets is purely for convenience as a way to make it easier to identify which device is which on PEMS screens. For example, you can name each device relating to its location or function - study, kitchen. The name is stored with the PEMS and not on the device itself.

For ease, there are a number ways that you can change the name which all lead to the same dialog box:

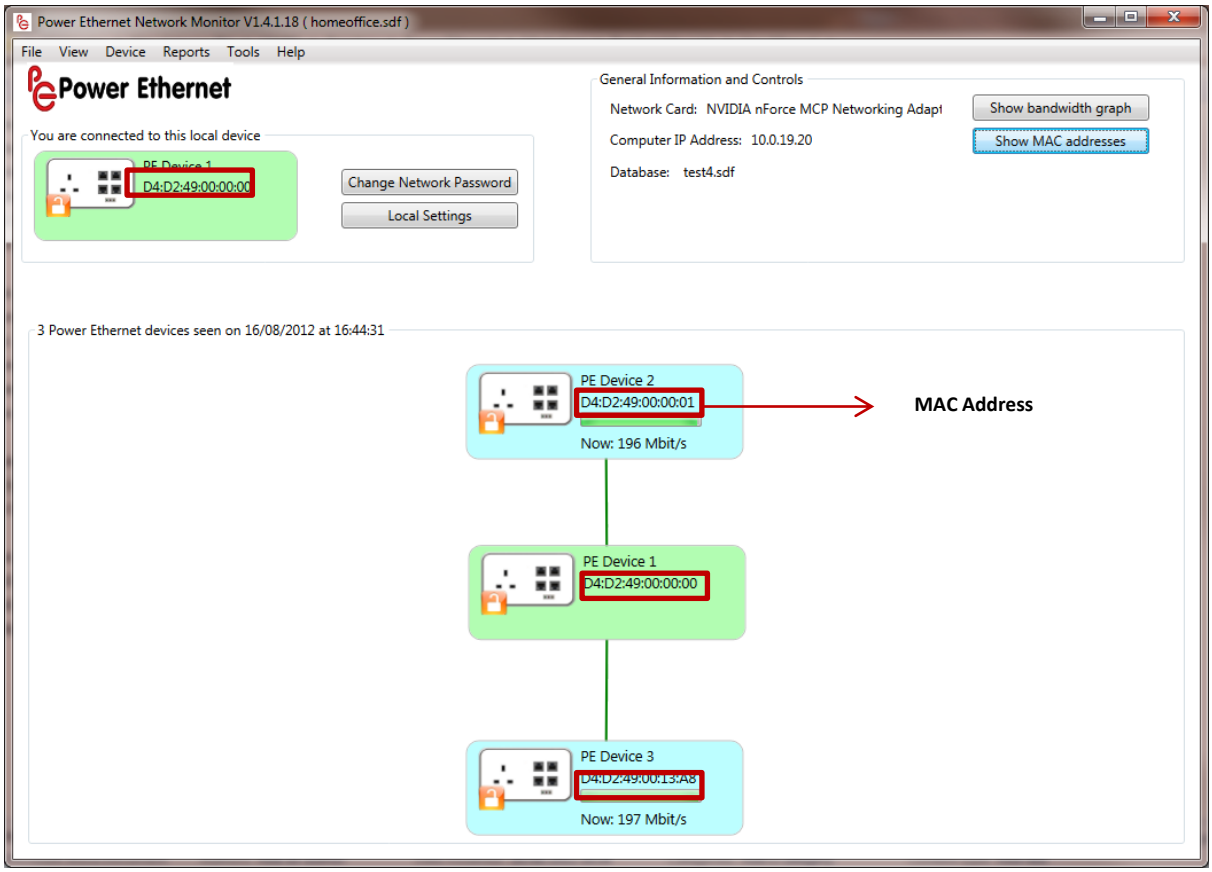
1) You can change the name of any device by clicking on its icon, which will open up the dialog box below.
2) You can change the name of the Local device by either clicking on its icon, clicking on Local Settings or using the pull down menu Device → Local → Name or via the key sequence Control-L

Enter the desired name in the "Name" field and press *Save*



NOTE: The socket name is automatically stored in the PEMS database and not in the PE Socket itself.

You do not need to rename the PE Sockets; it's purely there for your convenience. Each PE Socket has a unique MAC address – as you can see in the graphic below - which allows them to be identified. You can make this address visible either by clicking on the "Show MAC addresses" button on the top right or via the pulldown menu View → Show MAC Addresses. If you ever require technical support, the support agent will probably ask you for the MAC addresses.

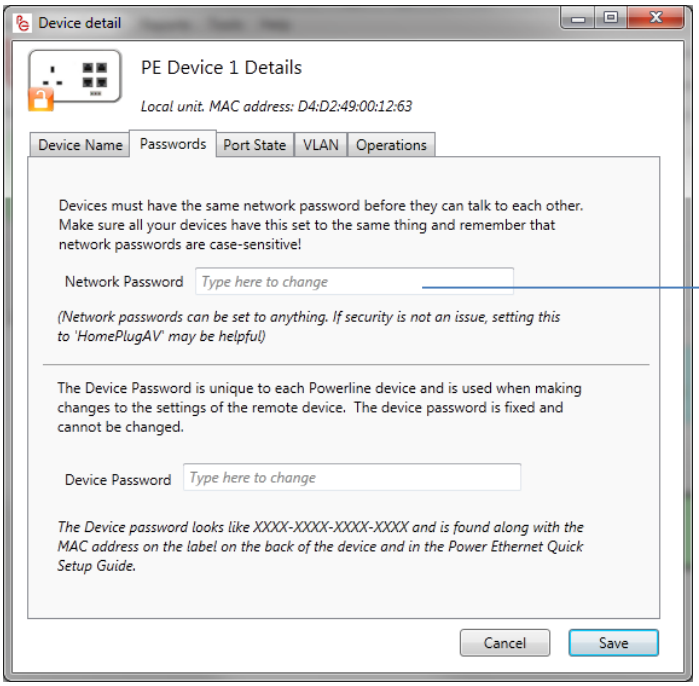


6.2.6. Securing the Powerline network

To secure the network it is recommended that you change the Network Password, as it is used as a key for the 128bit AES encryption. The default Network Password on many devices, including T1001 units, is set to *HomePlugAV.* This means that any devices with this Network Password, on the same electrical circuit, will automatically join together. Changing the Network Password secures the network against other devices joining and seeing information on that network.

The process to change the Network Password via the software is simple:

1. Ensure that all the PE Sockets are connected
2. Plug into each device in turn so that they become the local device in PEMS (it can take up to 10 seconds for PEMS to refresh its view)
3. Change the Network password (the same password must be used in each PE Socket connected to the network) by either clicking on its icon, clicking on Local Settings or using the pull down menu Device → Local → Password
4. Repeat step 2 and 3 until the Network Password has been changed to the same password for all the devices.


Device detail
PE Device 1 Details
Local unit. MAC address: D4:D2:49:00:12:63
Device Name
Passwords
Port State
VLAN
Operations
Devices must have the same network password before they can talk to each other. Make sure all your devices have this set to the same thing and remember that network passwords are case-sensitive!
Network Password
Type here to change
(Network passwords can be set to anything. If security is not an issue, setting this to 'HomePlugAV' may be helpful)
The Device Password is unique to each Powerline device and is used when making changes to the settings of the remote device. The device password is fixed and cannot be changed.
Device Password
Type here to change
The Device password looks like XXXX-XXXX-XXXX-XXXX and is found along with the MAC address on the label on the back of the device and in the Power Ethernet Quick Setup Guide.
Cancel
Save

Enter the new Network Password. The password is case sensitive and needs to be identical for the units to connect to each other.

NOTE: Only Powerline devices with the same Network Password can see each other. Ensure that the Network Password is set to the same password for all the PE Sockets. The Network Password is case sensitive.

TOP TIP: If any of the PE Sockets is not connecting to the others, try changing its Network Password to match the others

NOTE: If you forget the Network Password, you can always change it via the PEMS software.

6.2.7. Adding more PE Sockets or other Powerline devices

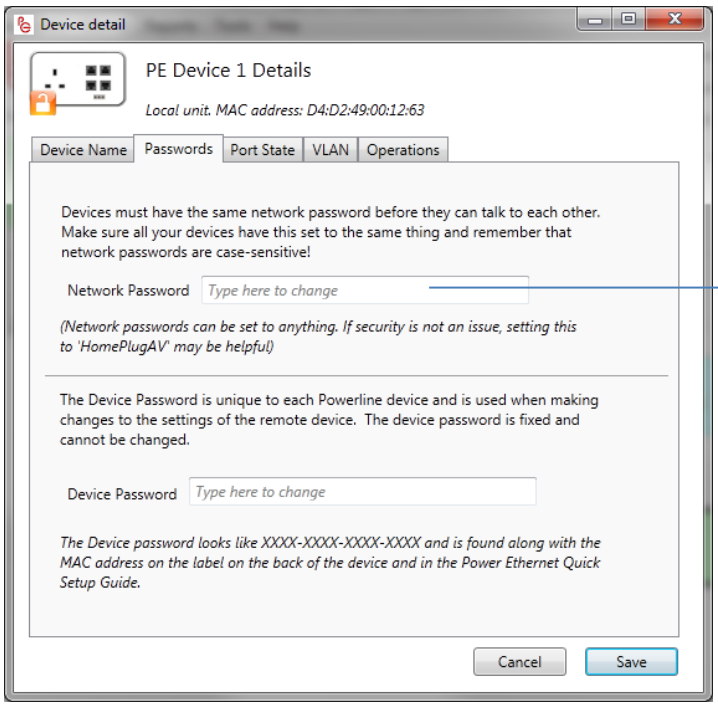
To add more PE Sockets/Powerline Devices to an existing Powerline Network by PEMS, just

1. Plug into each new device so that they become the local device in PEMS
2. Change the Network Password (the same password must be used in each PE Socket connected to the network) by either clicking on its icon, clicking on Local Settings or using the pull down menu Device → Local → Password
3. Repeat step 1 and 2 until all the Network Password has been changed to the same password for all the devices.

NOTE: Only Powerline devices with the same Network Password can see each other. Ensure that the Network Password is set to the same password for all the PE Sockets.

IMPORTANT: The PE Socket is compatible with the HomePlug AV standard. If there are any other Powerline devices plugged in that are not HomePlug AV compatible, then they will stop the Powerline network from working properly.

TOP TIP: Always unplug 3rd party Powerline adapters whilst setting up the Power Ethernet network and test the network is working correctly before adding those 3rd party Powerline adapters back.


Device detail
PE Device 1 Details
Local unit. MAC address: D4:D2:49:00:12:63
Device Name
Passwords
Port State
VLAN
Operations
Devices must have the same network password before they can talk to each other. Make sure all your devices have this set to the same thing and remember that network passwords are case-sensitive!
Network Password
Type here to change
(Network passwords can be set to anything. If security is not an issue, setting this to 'HomePlugAV' may be helpful)
The Device Password is unique to each Powerline device and is used when making changes to the settings of the remote device. The device password is fixed and cannot be changed.
Device Password
Type here to change
The Device password looks like XXXX-XXXX-XXXX-XXXX and is found along with the MAC address on the label on the back of the device and in the Power Ethernet Quick Setup Guide.
Cancel
Save

Enter the new Network Password. The password is case sensitive and needs to be identical for the units to connect to each other.

6.3. Intermediate settings

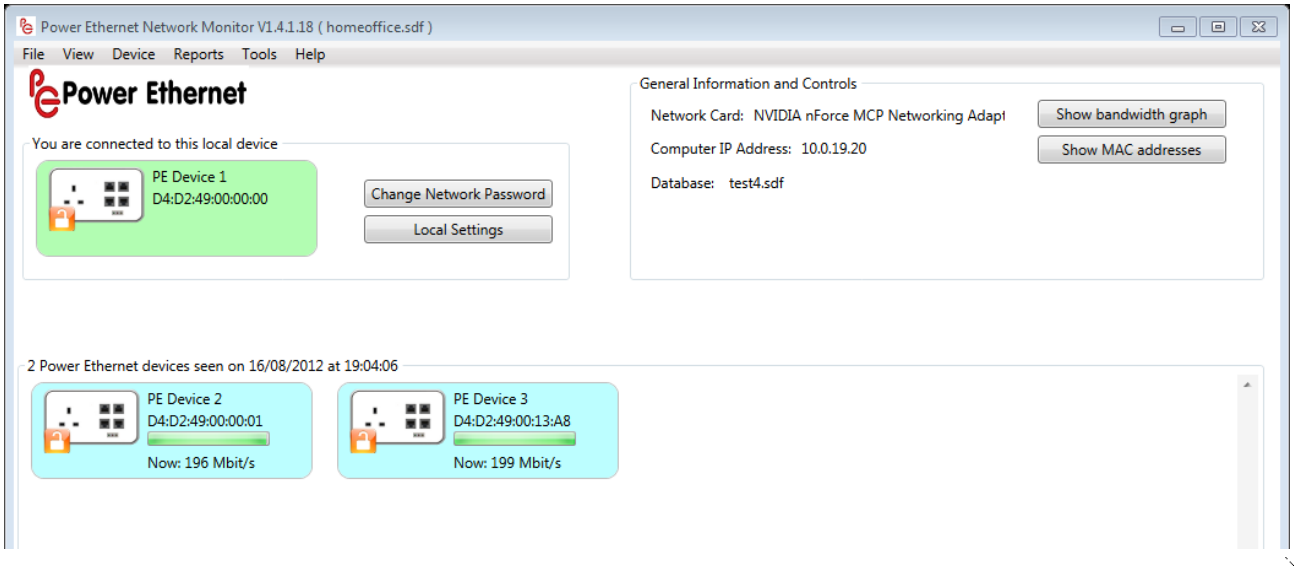
6.3.1. Different views

PEMS allows you to have 3 different views of the Powerline Network that helps you to visualise the network functionality better.

- The Star view which is the default view and has been explain previously.
- The Grid view
- The Row view

Grid View

The Grid View shows your local device apart from the remote devices. This view is useful when you have many devices connected to the same network, as it allows you to see all of them in an organised manner.

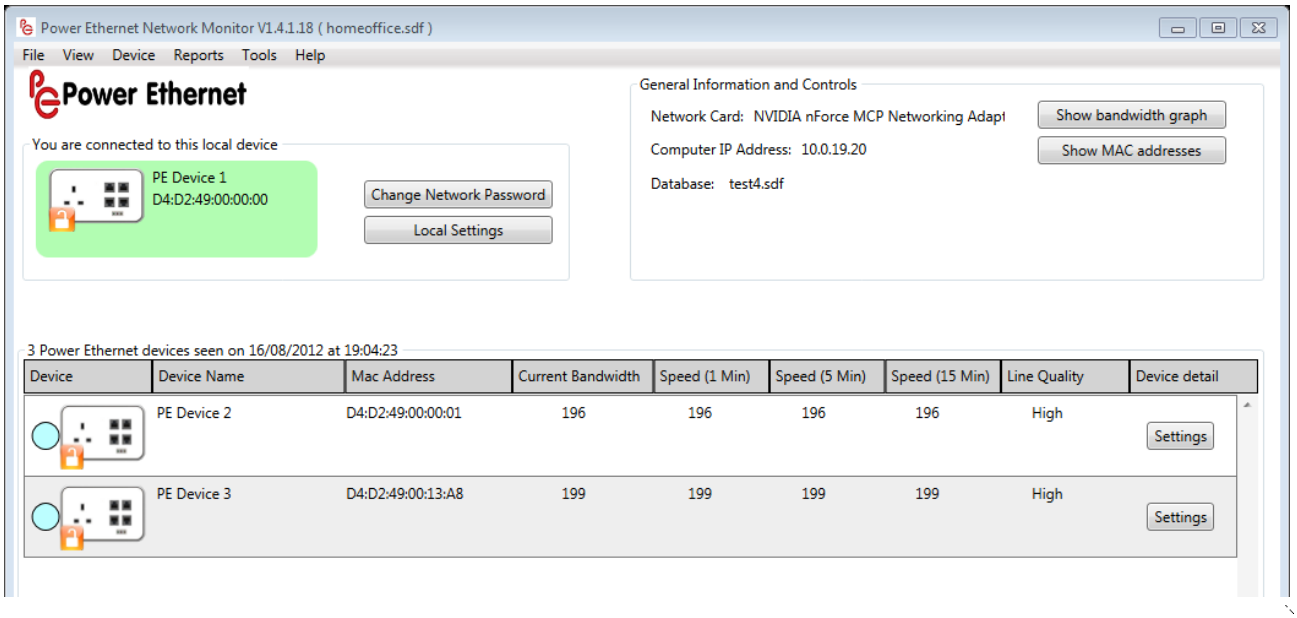


Row View.

The Row view has been designed to show a more detailed description of the PE Sockets connected to the network. It allows you to see:

- The quality of the Powerline connection (represented by the circle on the left of the socket icon and shown on “line quality”)
- The device name
- The MAC address
- The current available bandwidth
- The average available Powerline bandwidth in the last 1min, 5 min and 15min

You can also access the local settings of each socket connected to the network by clicking on “settings”.



6.3.2. Enter Device Password

The Device Password is required if you want to make advanced changes remotely to the Powerline devices. You don't need to enter it for the majority of operations you'll perform, however, you will be prompted if it is needed.

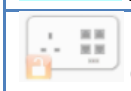
Note: The Device Password is printed on the back of each Power Ethernet Socket and for your convenience is printed on the sticker located on the Power Ethernet Quick Setup Guide and a spare sticker has been included in the packaging envelope. This Device Password is required if you want to remotely manage the PE Sockets using PEMS. The Device Password is not needed when connecting directly to a local PE Socket.

6.3.3. Understanding Different Speeds

The estimated Powerline bandwidth is measured on the speed of the link between the local device and the remote devices.

It shows the total amount of traffic that could flow on it, not how much traffic is currently flowing between two points at a given time. It may be seen as a measure of link quality.

Different speeds between the remote devices in respect to the local device depend on the link quality as per figure below:

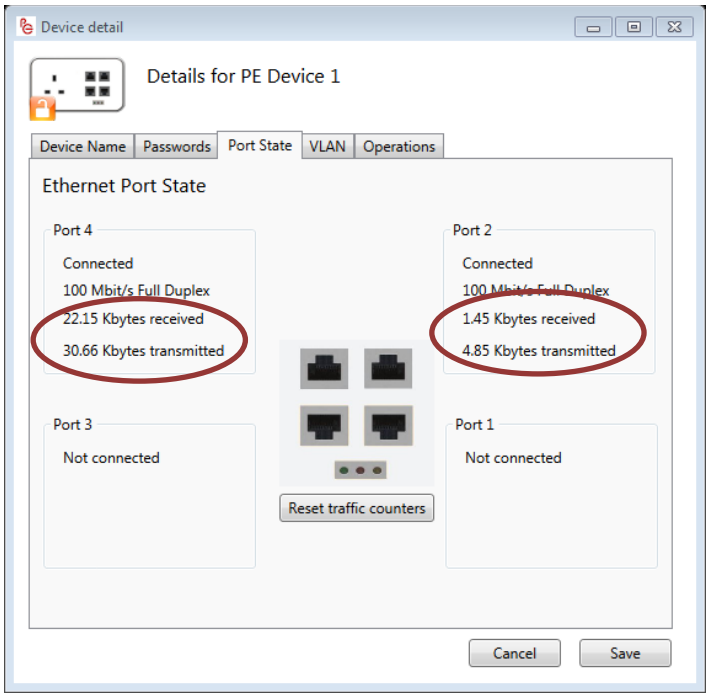
PE Socket Icon	Description	T1001 bandwidth range
White	Unit is awake and link quality is good to excellent (suitable for HD video streaming)	80 to 200 Mbps
Yellow	Unit is awake and link quality is ok to good. (suitable for SD video streaming)	30 to 80 Mbps
Red	Unit is awake and link quality is poor	0 to 30 Mbps
 **Grey**	The unit is inactive, asleep or communication has been lost.	No connection

6.3.4. Measure actual throughput per port

PEMS allows you to measure the actual throughput of each network port for every PE Socket installed in the network. This is a useful diagnostic utility to understanding the performance of the network.

By either clicking on the PE socket you want to measure, or by clicking on Local Settings or using the pull down menu Device → Local → Port State you will see:

- Which of the 4 Ethernet ports has an active Ethernet connection
- The Ethernet speed per port (for active connections)
- Current throughput rate received and transmitted per port



The screen shot above shows that Ports 4 and 2 have an active Ethernet connection along with the Ethernet speed and amount of data received and transmitted. It also shows that Ports 3 and 1 do not have an active Ethernet connection.

6.4. Advanced settings

6.4.1. Diagnostics and Reports

PEMS allows you to assess the performance of the PE Sockets at all times. It provides different reports that allow you make diagnostics and will show you the System Information and the Remote Device History of all remote devices seen over a period of time. Clicking on the **Reports** allows you to email or export the following reports when technical support is need it:

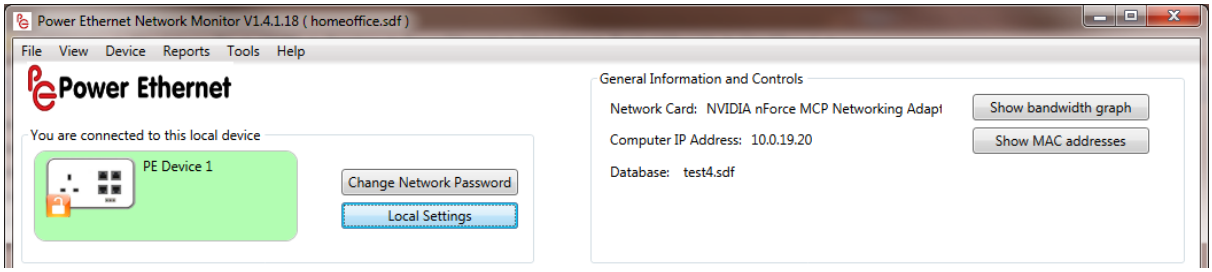
- Network reports
- Traffic data
- Bandwidth graph
- VLAN Layout

General system information and controls

On the right hand of the screen you find the general system information and settings including:

- Network card name
- Computer's IP Address
- PEMS Database currently in use
- Toggle the MAC addresses of all devices connected to the Powerline network

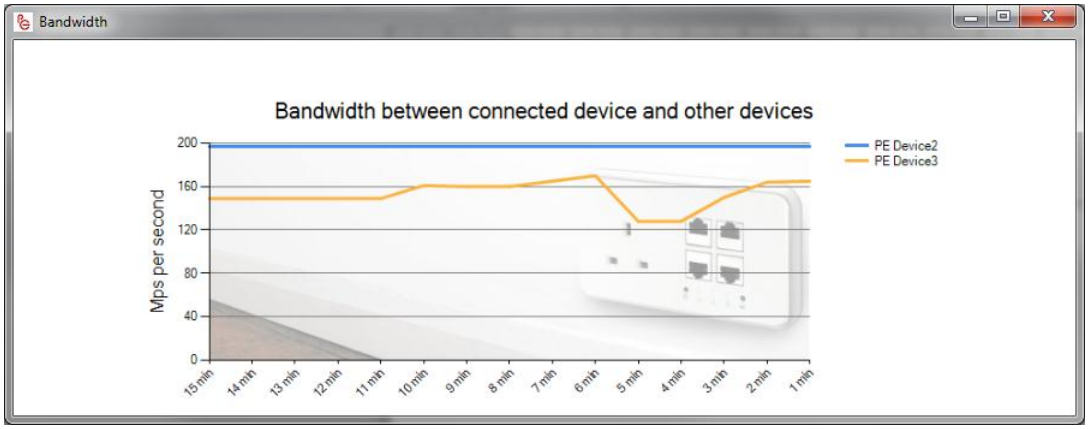
You can also easily access the bandwidth graph by clicking on the icon. The graph opens in a new Window.


Power Ethernet Network Monitor V1.4.1.18 (homeoffice.sdf)
File View Device Reports Tools Help
Power Ethernet
You are connected to this local device
PE Device 1
Change Network Password
Local Settings
General Information and Controls
Network Card: NVIDIA nForce MCP Networking Adapt
Computer IP Address: 10.0.19.20
Database: test4.sdf
Show bandwidth graph
Show MAC addresses

Bandwidth graph

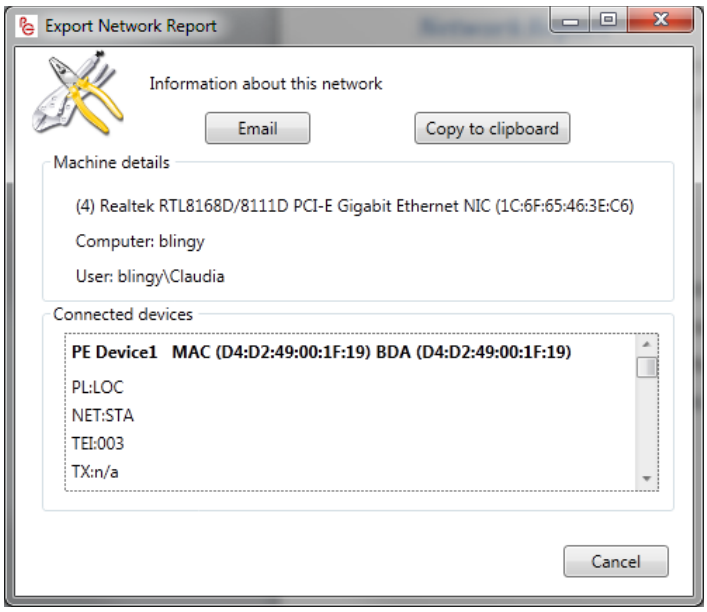
PEMS allows you to assess the performance of the Powerline network. It shows the estimated Powerline bandwidth from the local device to all remote devices over a period of time.

NOTE: The estimate Powerline bandwidth is measured on the speed of the link between the local device and the remote devices which is why there is not graphic for the local device.



Network Report

The Network report shows the performance lay out of the Powerline network as seen from the local device. This means, the number of PE Sockets or other Powerline devices in the network and their performance.



The network report information displayed can be copied and saved to a text file for later use or can be emailed to technical support if requested.

Traffic data

The traffic data report shows the amount of actual data that have been received and transmitted of all remote devices seen over a period of time.

The traffic data report can be saved to a text file or can be emailed as an Excel report for technical support.

VLAN Layout.

The VLAN report shows a simple list of VLAN names and, for each, which ports on which unit are in that VLAN.

The VLAN report can be saved to a text file or can be emailed as an Excel report for technical support.

6.4.2. Managing Databases

PEMS allows installers who manage multiple installations of PE Sockets to keep a separate database for each site. You can:

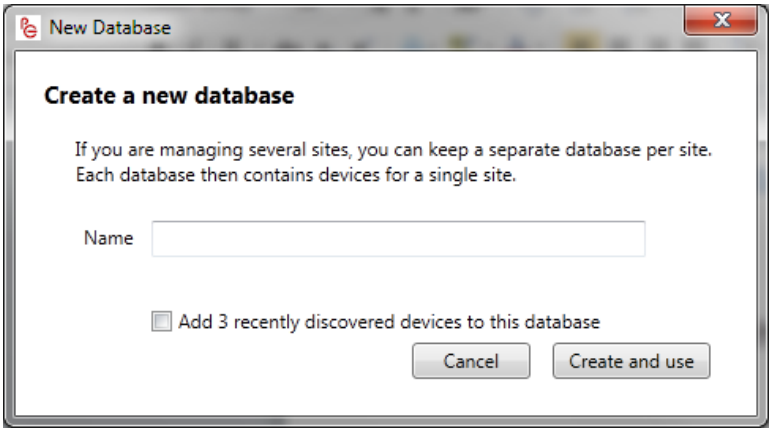
- Create a new database.
- Open an existing database
- Delete a database

Create a new database

To create a new database, go to File→Database→New

As well as naming the new database, you also have the option of adding devices discovered since PEMS was started, e.g. those on the new site, to that database.

Just type the name of the database you want to create and it will be immediately loaded into PEMS main screen.


New Database
Create a new database
If you are managing several sites, you can keep a separate database per site.
Each database then contains devices for a single site.
Name
Add 3 recently discovered devices to this database
Cancel
Create and use

NOTE: PEMS allows for recently discovered Powerline devices to be quickly added to the new database.

Open an existing database

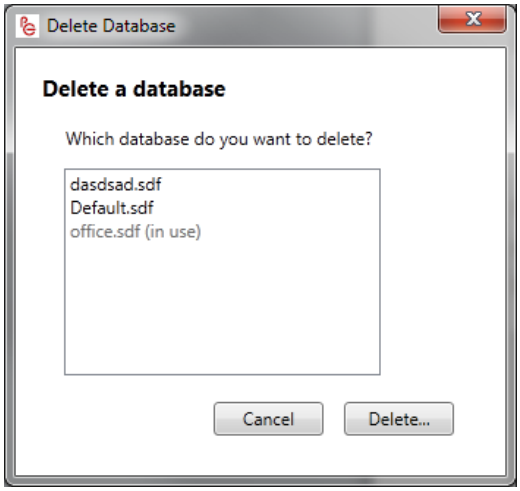
To open an existing database go to File→Database→Open

It will present you with a standard "open file" dialog window. Choose the desired database and it will be loaded into PEMS main screen

Delete a database

To delete a new database go to File→Database→Delete

It will take you to a screen that allows you to choose from the databases already available, select the one you want to delete and delete it.

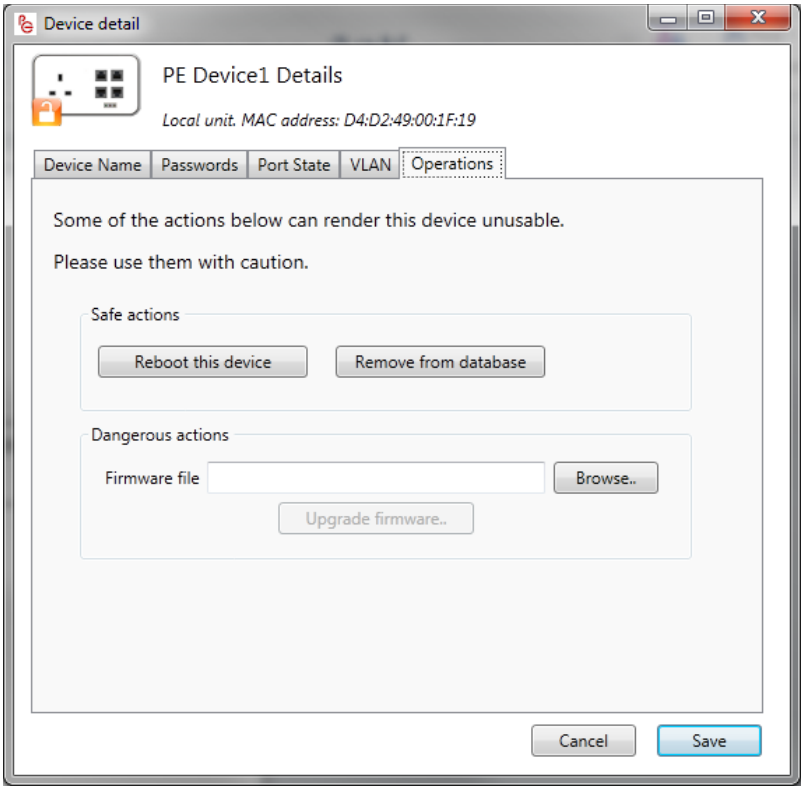


6.4.3. Advanced operations

NOTE: We recommend the use of operations with care as some of the actions can make the PE Socket or Powerline device unusable.

The operations menu allows you to reboot or remove a specific PE Socket or Powerline device. It also allows you to upgrade the firmware.

To access operations go to Device→Operations it will take you to the following screen:



Reboot the device

PEMS allows you to reboot a specific PE Socket or Powerline device that is connected to the network.

Just select the PE Socket/ Powerline device you want to reboot by double clicking on its icon go to **Operations** and click on reboot this device (see graphic above). The selected device will reboot immediately.

This is equivalent to pressing the reset button on the device.

Remove device from database

This operation allows you to remove a specific device from the current database. For this, select the PE Socket/ Powerline device you want to reboot by double clicking on its icon go to **Operations** and click on remove from database (see graphic above). The selected device will be removed from the current database immediately.

Upgrade the firmware

If required, the firmware can be upgraded using the PEMS by clicking on Operations on the Help tab.

To upgrade the device's firmware, follow these instructions:

1. Download PIB file and firmware upgrade file from Power Ethernet Help Site (http://help.powerethernet.com).
2. Enter the path name or click **Browse…** to select the downloaded files on the computer into the corresponding blanks.
3. Click the OK button.

Note: Do not turn off the device while the firmware is being upgraded. The device will reboot after the upgrading has been finished.

Technical Note: "Firmware", in this context, refers to the Qualcomm-Atheros Parameter Information Block. The PEMS does not allow you to upload new non-volatile memory (nvm) images.

Although the PEMS does not support the operation, it is possible, via some software, to tell a PE Socket to revert to factory defaults. If that operation is invoked, any firmware uploaded using PEMS will be deleted from the device and it will mostly go back to how it was when it shipped.

Reverting to factory defaults will not, however, remove any configuration of the Ethernet switch. For example, reverting to factory defaults will not remove VLAN settings.

6.4.4. Virtual LAN Settings

WARNING: The use of VLANs is advanced functionality and should be only implemented by those who understands the concepts and the benefits and pitfalls of such advanced networking.

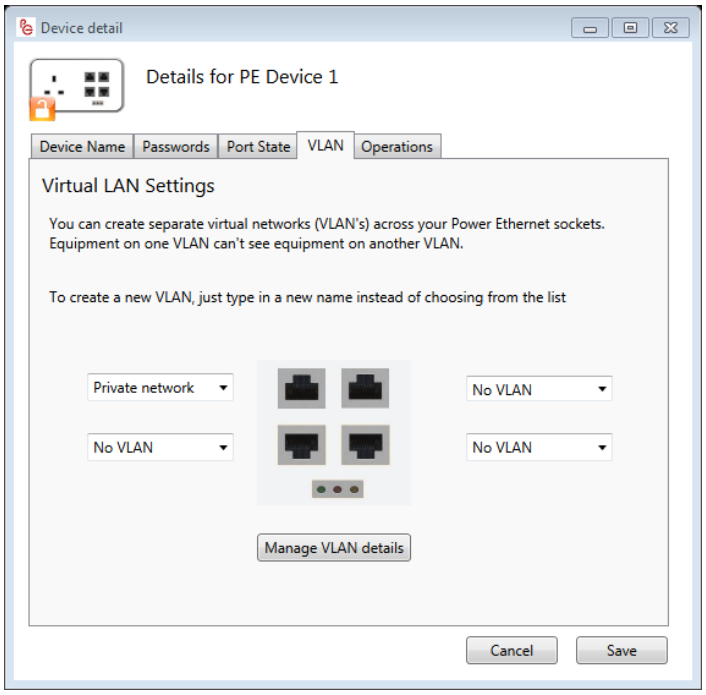
NOTE: Although VLANs are supported by the T1001 PE Socket, technical support is not provided for individual configurations and it is assumed that the administrator understands the concepts to support themselves.

A virtual local area network, virtual LAN or VLAN is a concept of partitioning a physical network, so that distinct broadcast domains are created. This is usually achieved on switch or router devices.

To physically replicate the functions of a VLAN would require a separate, parallel collection of network cables and equipment separate from the primary network. However, unlike physically separate networks, VLANs share bandwidth, so VLAN trunks may be setup to replicate dedicated cabling between Ethernet ports without actually having to run the cables.

The T1001 PE Socket supports up to 16 distinct VLANs. Each VLAN can include between 1 and 4 Ethernet ports.

To create a new VLAN, edit the settings for one of the devices to be included in the VLAN and, beside the chosen Ethernet port, click on the "No VLAN" phrase and type in a name of the VLAN. The VLAN ID is chosen automatically, starting a 2.



The new VLAN name will be added to the drop-down menu next to the other three ports. If desired, you can add more ports to that VLAN by choosing the VLAN name in the other pull-down menus. Alternatively, type in a new VLAN name next to another port or choose “Save” and repeat the operation on another device.

Ethernet ports in a particular VLAN will automatically be connected and the traffic sent between them will not be accessible from the other Ethernet ports and vice versa.

The T1001 PE Socket supports up to 16 VLANs which can be used to connect 2 or more Ethernet ports together.

To view the status of a VLAN, edit or delete it, click on the “Manage VLAN details” button with the VLAN tab. Here you can see the complete list of the VLANs setup within the network and make amendments.

NOTE: Reports on the VLAN configuration can be accessed from the Reports pull-down menu.

7. Troubleshooting

The latest version of the documentation can be found at http://**help.powerethernet.com**

7.1. Why can't my PE Sockets connect to each other?

If your PE Sockets cannot connect to each other, please check the following:

1. The Power light should be solid green on all the PE Sockets which indicates that the devices are powered on. If it has turned red, then the unit has gone to sleep. A short press of the Reset button (**R**) will reboot the device. The unit will reset itself and will stay on for 15 minutes regardless of whether an active Ethernet cable is plugged in.
2. The PLC Connection light should be a solid colour.
3. If the PLC Connection light is off, then it is unable to see any other PE Sockets or 3rd party units sharing the same Network Password. It is possible that the PE Socket have a different Network Password. Using the PEMS as described in Section 6, change the Network Passwords on the PE Sockets to ensure that they match.
4. If this is still unsuccessful, please check your other units in the same way. Check that the PE Sockets are wired in the same electrical phase.

7.2. The network speed is not fast enough to transmit video

There are two main reasons:

1. Too much electrical interference on the power circuit: – Electrical noise impacts the amount of available bandwidth on a Powerline network. Lamps with dimmers, scent plugins, mobile phone chargers and power supply units among others, are very noisy devices.
    a. Try and isolate the noisy source by unplugging these devices whilst Plug electrically noisy devices (like chargers and transformers) at least one meter away from the PE Sockets or directly into the PE Socket's filtered socket so that the noise can be filtered to reduce its effect.
    b. Test if devices around the home are affecting the Powerline network by turning them off and on and see if the bandwidth improves. Use PEMS to see what the available bandwidth is during these tests. NOTE it can take a minute or two for the PPU Software to recalculate the network speed.
    c. Its good practice to plug any offending devices directly into a PE Socket as it is filtered.
2. Distance between the PE Sockets. The available bandwidth will decline over distance and the maximum range between PE Sockets is 300m. If the electrical cables between them are longer that 300m or the quality of the power networks cables is not optimal, the range of communication between sockets will be reduced. Please check if you are suffering from poor network speeds.

7.3. The Power Light is always off

If the Power light is off, then there is no electrical supply to the Power Ethernet socket; please check the following:

1. That the electrical mains is working
2. The mains power is ON for that circuit.
3. Test the power to the Power Ethernet Socket by plugging a device into its mains socket
4. Make sure other power sockets in the same circuit are working.

If the Power Light is still off, call an electrician to confirm the PE Socket is wired correctly. If it still fails, please fill the feedback form in at http://**help.powerethernet.com**

7.4. The PLC light is always off

If the PLC light is off and the Power light is red, it means that this Power Ethernet Socket is asleep or in hibernation. PE Sockets automatically go into sleep mode when there is no active Ethernet connection. Plug in an active Ethernet cable and the PE Socket will wake up within a couple of seconds. (You can force it to wake up by a short press of the Reset button (**R**) at which point this PE Socket will remain awake for 15 minutes regardless of whether there is an active Ethernet connection plugged into it or not.)

Ensure that at least 2 PE Sockets are awake and check if the PLC Connection light becomes solid. The PEMS is a useful diagnostic tool as it will not only show how many PE Sockets or Powerline devices are connected together but also the estimated speeds between them.

Powerline devices are only able to connect to each other if they share the same Network Password. If all the PE Sockets bar one are connected together, it is possible that the disconnected PE Socket has left the Powerline network and now has a different Network Password. By using PEMS, you can reset the Network Password on the disconnected unit to the same Network Password in the other units.

NOTE: The power outlets must be electrically connected and sharing the same power phase in order for the PE Sockets to provide a network connection between them.

7.5. The Network Activity light is always off

The Network Activity light goes solid when there is an active Ethernet cable plugged into one of the 4 Ethernet ports on the front of the PE Socket. It blinks to show it is Ethernet activity.

If the Power light is green (PE Socket is awake) and the device plugged into the Ethernet port is switched on, the Ethernet Activity light should also be on (solid or blinking). Check that the devices connected to the PE Socket are on, the networking functionality is enabled and check the connection of the Ethernet cable.

If the Power light is red then the unit is asleep or in hibernation mode. It is designed to wake up automatically when one of the Ethernet ports is active but it has to be manually woken up from hibernation mode. A short press of the Reset button (**R**) will wake up the unit. If the Ethernet light is off, then try another Ethernet cable.

7.6. I'm not getting Internet connectivity using the PE Sockets

Ensure that one PE Socket is connected to the router to share Internet connectivity between all the PE Sockets installed in the same network. The router can be connected to any of the PE Sockets.

Try isolating the PE Socket by plugging a computer directly into the router and test the Internet connection. Check the Ethernet cables and if this does not work, then there is possibly a problem with the Internet connection and you need to contact your Internet Service Provider or IT department.

7.7. How do I assess the performance of the PE Sockets?

PEMS is described in this User Guide and can give an accurate estimate on the available bandwidth across the Powerline network. The software can be downloaded from http://**help.powerethernet.com**

For more detailed tests, network speed tests can be performed across the Powerline network but this is outside of the scope of this document.

7.8. Can I change the passwords?

There are a number of different passwords in the Powerline standard:

Network Password: This is the password used to create a single Powerline network and can be set via PEMS. The default Network Password for PE Sockets is *HomePlugAV*

Device Password: This password is used to remotely manage a Powerline device via the software and is hard coded into the device and cannot be changed. For PE Sockets, the Device Password is printed on the back of each Power Ethernet Socket and is also printed on the sticker located on the Power Ethernet Quick Setup Guide that came with that unit along with a spare sticker in the packaging envelope. This Device Password is only required if you want to remotely manage the PE Sockets using PEMS. The Device Password is not needed when connecting directly to a local PE Socket.

7.9. I'm trying to connect my Powerline adapters to my PE Sockets network but they are unable to connect

First check that the Powerline adaptors are compatible with HomePlug AV standard. If they are not compatible with HomePlug AV standard then they will stop the Powerline network from working properly.

If the adaptors are HomePlug AV compatible, then the Network Password needs to be the same as that used by the PE Sockets. The Network Password for PE Sockets defaults to *HomePlugAV*. Alternatively, you can change the network key on all Powerline devices to something more secure via the respective software.

7.10. I bought only one PE Socket and I cannot setup a network?

Powerline networking needs two or more devices to create a network. You can mix and match between PE Sockets and HomePlug AV compatible Powerline adapters (make sure that the Network Password is the same)

7.11. Can I connect my dedicated WiFi router to the PE Sockets?

Yes, you can use the PE Sockets to extend your network throughout your home to help you place the WiFi router in the optimal location to provide WiFi coverage. Simply connect your dedicated WiFi router to any one of the PE Sockets using a CAT5 cable.

7.12. How do I connect the PE Sockets across different electrical phases.

If the phases are joined at the electrical consumer unit, the Powerline network will run everywhere where there is a connectivity path. If the circuits are isolated, then the network can be joined together using CAT5 cables. A phase coupler will also work.

Within commercial buildings, 3 phase power is common. For more complex installations which may include multiple electrical phases, download the Power Ethernet Commercial Installations whitepaper from http://help.powerethernet.com.

Appendix 1: Technical Specification

The technical specification for the PE Socket 200AV T 1001 is:

Standards	Ethernet specifications IEEE 802.3, IEEE 802.3x, IEEE 802.3u, Auto MDI / X, HomePlug AV compatible. Compatible with the IEEE1901 standard.
Powerline Standard	HomePlug Alliance 200AV compatible
Protocols	TDMA, CSMA/CA over power supply grid
Transmission speed	200 Mbps (gross)
Transmission method	Asynchronous
Modulation	OFDM - 1155 carriers, 1024/256/64-QAM, QPSK, BPSK
Data path	Ethernet <-> power supply grid (Uses mains cables for data connection)
Mains connection	Standard 3 wire (LEN)
Range	Up to 300m over power supply grid
Security	128-bit AES encryption over power supply
LED indicators	Power Powerline Connection (Link/Activity/quality) Network Activity (Link/Activity)
Buttons	Join / Leave button Reset / Force Hibernation (long press)
Socket	UK: Type G (BS 1363)
Power output to socket	230 V / 13 A maximum
Device port	4 x Ethernet RJ45 connected to a managed switch
Power consumption	5 W (max.), 1.5 W in standby 0.5W in hibernation
Power supply	AC 220-240V 50/60Hz
Damping filter	2 – 30 MHz
Filter characteristics	30 dB
Temperature Storage:	0°C – 35°C
Operation:	5°C – 40°C
Product Weight	261 g
Dimensions	Designed to fit a standard 35mm deep UK double gang metal wall box and shallower back boxes with the included collar.
Ambient conditions	10–90% humidity (non-condensing)
System requirements	Ethernet interface
Works with	Supports all operating systems Windows, Mac, Linux and all operating systems with Ethernet ports (RJ45)

CE Conformity

This product complies with the technical requirements of:

- EMC directive:2004/108/EC
- Low voltage directive: 2006/95/EC
- ERP directive: 2009/125/EC

The CE Certificate can be downloaded from http://**help.powerethernet.com/ce**

Appendix 3: Guarantee

Guarantee Conditions

This product is guaranteed for 2 years from the date of purchase against faulty materials or workmanship. During this period *Power Ethernet* reserves the right to repair or replace the defective product with a comparable product with the same specifications and features free of charge providing that:

1. The product is returned to Power Ethernet or to wholesaler from whom the product was originally purchased, together with proof of purchase.
2. The returns policy and procedure has been correctly followed.
3. The label with the serial number has not been removed from the product.
4. The product has been used for its intended purpose and connected to a mass supply of 220-240 volts 50 Hz AC.
5. The product is not kept or used in areas of high humidity.
6. The product has not been misused or handled carelessly.
7. The product has not been damaged or destroyed as a result of acts of nature or by environmental influences (moisture, electric shock, dust, etc.)
8. The product has not been tampered with.
9. The product's ventilation slots and openings have not been blocked.
10. The product has been properly installed in accordance with the relevant wiring regulations and installation practices.
11. The product has not been opened, repaired or modified by persons not contracted by Power Ethernet.
12. The device does not show any kind of mechanical damage other than natural wear and tear.
13. The guarantee claim has been reported correctly.

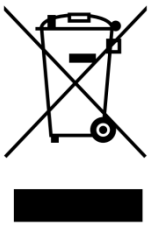
This Guarantee does not affect your Statutory Rights other than those expressly set out above and does not cover any claims for consequential loss or damage.

Guarantee procedure

- If defects appear during the guarantee period, the guarantee claims must be made immediately, at the latest within a period of 7 days.
- In the case of any externally visible damage arising from transport (e.g. damage to the housing), the person carrying out the transportation and the sender should be informed immediately. On discovery of damage which is not externally visible, the transport company and the sender are to be immediately informed in writing, at the latest within 3 days of delivery.
- Transport to and from the location where the guarantee claim is accepted and/or the repaired device is exchanged, is at the purchaser's own risk and cost.
- Guarantee claims are only valid if a copy of the original purchase receipt is returned with the device. Power Ethernet reserves the right to require the submission of the original purchase receipt.

Disposal of old devices

The Waste of Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC) has been put in place to recycle products using best available recovery and recycling techniques to minimise the impact on the environment, treat any hazardous substances and avoid the increasing landfill.



The symbol shown above and on the product means that the product is classed as Electrical Equipment and you should not put it into your domestic waste bin. When you have no more use for it, please dispose of the product according to your local authority's recycling scheme. For more information, please contact your local authority or the retailer where you purchased the product.

NOTE: For further information. Please consult http://**help.powerethernet.com**